Mitsubishi Electric ilmalämpöpumput korjaa ja huoltaa pääkaupunkiseudulla: Jäähdytinpalvelu RefGroup Oy

Changes for the Better

MITSUBISHI ELECTRIC

SPLIT-TYPE, HEAT PUMP AIR CONDITIONERS

Revision A:
- MUZ-A12YV-E1 and MUZ-A12YVH-E1 can be connected to MCFZ-A12WV-E1.
- Some mistakes were corrected.

Please void OB328.

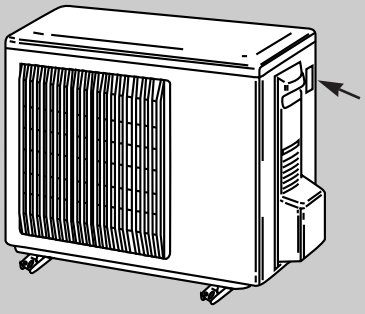
No. OB328
REVISED EDITION-A

HFC utilized R410A

SERVICE MANUAL

Wireless type
Models

MUZ-A09YV -E1
MUZ-A12YV -E1
MUZ-A09YVH -E1
MUZ-A12YVH -E1



Indication of model name
MUZ-A09YV -E1
MUZ-A12YV -E1
MUZ-A09YVH -E1
MUZ-A12YVH -E1

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NOTE:
This service manual describes technical data of the outdoor units.
•As for indoor units MSZ-A09YV-E1 and MSZ-A12YV-E1, refer to the service manual OB327.
•As for indoor unit MCFZ-A12WV-E1, refer to the service manual OB344.

CE

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Revision A:
- MUZ-A12YV-E1 and MUZ-A12YVH-E1 can be connected to MCFZ-A12WV-E1.
- Some mistakes were corrected.

1 TECHNICAL CHANGES

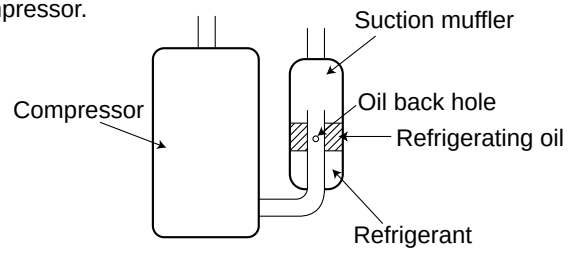
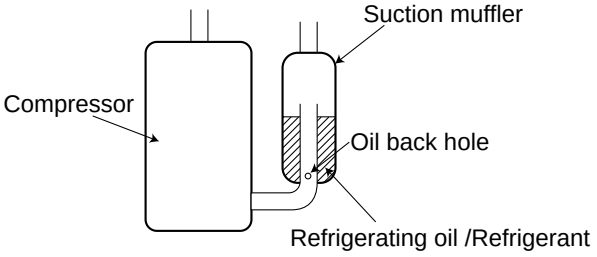
INFORMATION FOR THE AIR CONDITIONER WITH R410A REFRIGERANT

- This room air conditioner adopts an HFC refrigerant (R410A) which never destroys the ozone layer.
- Pay particular attention to the following points, though the basic installation procedure is same as that for R22 air conditioners.

① As R410A has working pressure approximate 1.6 times as high as that of R22, some special tools and piping parts/ materials are required. Refer to the table below.
② Take sufficient care not to allow water and other contaminations to enter the R410A refrigerant during storage and installation, since it is more susceptible to contaminations than R22.
③ For refrigerant piping, use clean, pressure-proof parts/materials specifically designed for R410A. (Refer to 2. Refrigerant piping.)
④ Composition change may occur in R410A since it is a mixed refrigerant. When charging, charge liquid refrigerant to prevent composition change.

		New refrigerant	Previous refrigerant
Refrigerant	Refrigerant	R410A	R22
	Composition (Ratio)	HFC-32: HFC-125 (50%:50%)	R22 (100%)
	Refrigerant handling	Pseudo-azeotropic refrigerant	Single refrigerant
	Chlorine	Not included	Included
	Safety group (ASHRAE)	A1/A1	A1
	Molecular weight	72.6	86.5
	Boiling point (℃)	-51.4	-40.8
	Steam pressure [25℃](Mpa)	1.557	0.94
	Saturated steam density [25℃](Kg/m³)	64	44.4
	Combustibility	Non combustible	Non combustible
	ODP ※1	0	0.055
	GWP ※2	1730	1700
	Refrigerant charge method	From liquid phase in cylinder	Gas phase
	Additional charge on leakage	Possible	Possible
Refrigerating oil	Kind	Incompatible oil	Compatible oil
	Color	Non	Light yellow
	Smell	Non	Non

※1 :Ozone Destruction Parameter : based on CFC-11
※2 :Global Warmth Parameter : based on CO_2

	New Specification	Current Specification
Compressor	The incompatible refrigerating oil easily separates from refrigerant and is in the upper layer inside the suction muffler. Raising position of the oil back hole enables to back the refrigerating oil of the upper layer to flow back to the compressor. 	Since refrigerant and refrigerating oil are compatible each, refrigerating oil backs to the compressor through the lower position oil back hole. 

NOTE : The unit of pressure has been changed to MPa on the international system of units(SI unit system).
The conversion factor is: **1(MPa [Gauge]) =10.2(kgf/㎠ [Gauge])**

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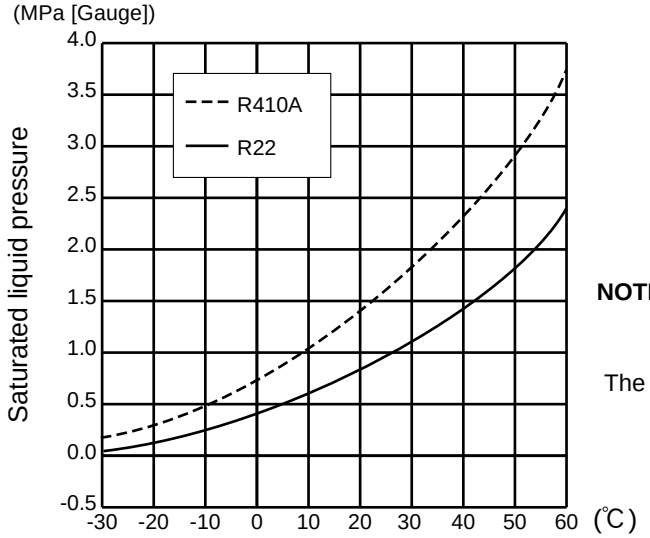
Conversion chart of refrigerant temperature and pressure



NOTE : The unit of pressure has been changed to MPa on the international system of units(SI unit system).

The conversion factor is: **1(MPa [Gauge]) =10.2(kgf/㎠ [Gauge])**

1.Tools dedicated for the air conditioner with R410A refrigerant

The following tools are required for R410A refrigerant. Some R22 tools can be substituted for R410A tools.
The diameter of the service port on the stop valve in outdoor unit has been changed to prevent any other refrigerant being charged into the unit. Cap size has been changed from 7/16 UNF with 20 threads to 1/2 UNF with 20 threads.

R410A tools	Can R22 tools be used?	Description
Gauge manifold	No	R410A has high pressures beyond the measurement range of existing gauges. Port diameters have been changed to prevent any other refrigerant from being charged into the unit.
Charge hose	No	Hose material and cap size have been changed to improve the pressure resistance.
Gas leak detector	No	Dedicated for HFC refrigerant.
Torque wrench	Yes	6.35 mm and 9.52 mm
	No	12.7 mm
Flare tool	Yes	Clamp bar hole has been enlarged to reinforce the spring strength in the tool.
Flare gauge	New	Provided for flaring work (to be used with R22 flare tool).
Vacuum pump adapter	New	Provided to prevent the back flow of oil. This adapter enables you to use vacuum pumps.
Electronic scale for refrigerant charging	New	It is difficult to measure R410A with a charging cylinder because the refrigerant bubbles due to high pressure and high-speed vaporization

No : Not Substitutable for R410A Yes : Substitutable for R410A

2.Refrigerant piping

① Specifications

Use the refrigerant pipes that meet the following specifications.

Pipe	Outside diameter mm	Wall thickness	Insulation material
For liquid	6.35	0.8 mm	Heat resisting foam plastic Specific gravity 0.045 Thickness 8 mm
For gas	9.52	0.8 mm	
	12.7	0.8 mm	

• Use a copper pipe or a copper-alloy seamless pipe with a thickness of 0.8 mm. Never use any pipe with a thickness less than 0.8mm, as the pressure resistance is insufficient.

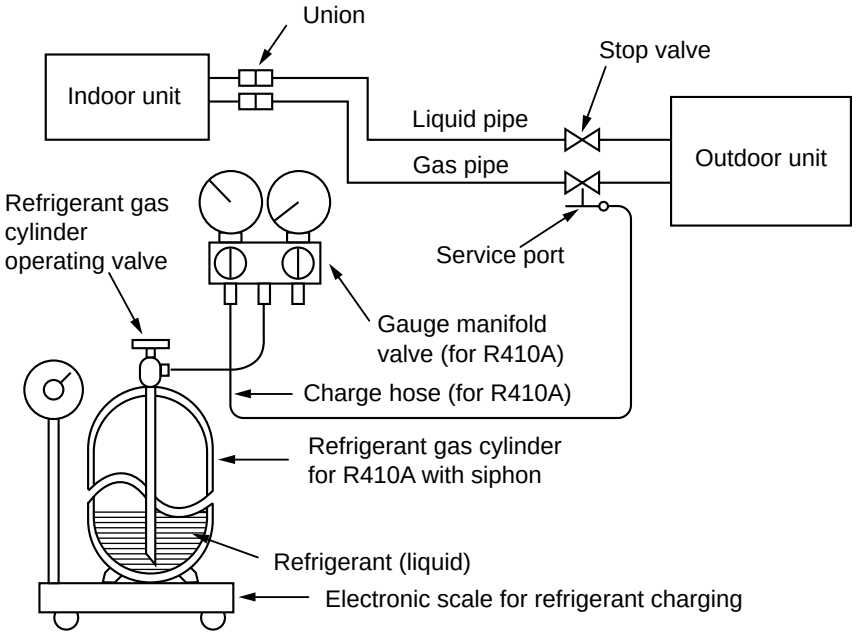
② Flaring work and flare nut
Flaring work for R410A pipe differs from that for R22 pipe.
For details of flaring work, refer to Installation manual “FLARING WORK”.

Pipe diameter	Dimension of flare nut	
mm	R410A	R22
6.35	17	17
9.52	22	22
12.7	26	24

3.Refrigerant oil
Apply the special refrigeration oil (accessories: packed with indoor unit) to the flare and the union seat surfaces.

4.Air purge
- Do not discharge the refrigerant into the atmosphere.
  Take care not to discharge refrigerant into the atmosphere during installation, reinstallation, or repairs to the refrigerant circuit.
- Use the vacuum pump for air purging for the purpose of environmental protection.

5.Additional charge
For additional charging, charge the refrigerant from liquid phase of the gas cylinder.
If the refrigerant is charged from the gas phase, composition change may occur in the refrigerant inside the cylinder and the outdoor unit. In this case, ability of the refrigerating cycle decreases or normal operation can be impossible. However, charging the liquid refrigerant all at once may cause the compressor to be locked. Thus, charge the refrigerant slowly.



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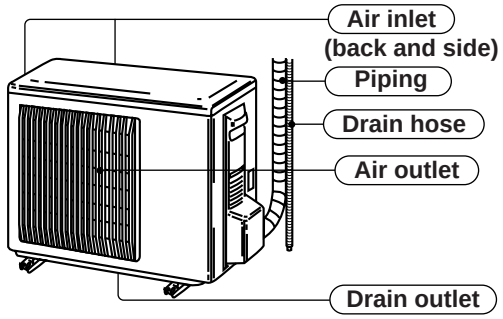
2 PART NAMES AND FUNCTIONS

MUZ-A09YV -E1 **MUZ-A12YV -E1**
MUZ-A09YVH -E1 **MUZ-A12YVH -E1**

OUTDOOR UNIT



ACCESSORIES

OUTDOOR UNIT

		MUZ-A09YV -E1 MUZ-A12YV -E1
①	Drain socket	1

3 SPECIFICATION

Outdoor model			MUZ-A09YV - E1 MUZ-A09YVH - E1 Indoor model MSZ-A09YV - E1		MUZ-A12YV - E1 MUZ-A12YVH - E1 Indoor model MSZ-A12YV - E1		MUZ-A12YV - E1 MUZ-A12YVH - E1 Indoor model MCFZ-A12WV - E1	
Function			Cooling	Heating	Cooling	Heating	Cooling	Heating
Power supply			Single phase 230V,50Hz		Single phase 230V,50Hz		Single phase 230V,50Hz	
Capacity	Capacity Rated frequency(Min.~Max.)	kW	2.5 (0.9-3.2)	3.2 (0.9-5.0)	3.5 (1.0-4.1)	4.0 (0.9-6.0)	3.5 (1.0-4.1)	3.9 (0.9-5.9)
	Dehumidification	ℓ /h	1.4	—	2.0	—	2.0	—
	Air flow	m³ /h	1900		1900		1900	
Electrical data	Starting current ✻1	A	3.90		5.00		5.00	
	Compressor motor current ✻1	A	2.89	3.49	4.57		4.46	
	Fan motor current	A	0.24		0.24		0.24	
Coefficient of performance(C.O.P) ✻1			3.73	3.81	3.21	3.70	3.21	3.61
Compressor	Model		KNB073FBVH		KNB092FAAH		KNB092FAAH	
	Output	W	550		650		650	
	Winding resistance(at 20℃)	Ω	U-V 1.53 U-W 1.53 V-W 1.53		U-V 0.49 U-W 0.49 V-W 0.49		U-V 0.49 U-W 0.49 V-W 0.49	
Fan motor	Model		RA6V21-AA		RA6V21-AA		RA6V21-AA	
	Winding resistance(at 20℃)	Ω	WHT-BLK 347 BLK-RED 281		WHT-BLK 347 BLK-RED 281		WHT-BLK 347 BLK-RED 281	
	Dimensions W×H×D	mm	800×550×285		800×550×285		800×550×285	
	Weight	kg	33		34		34	
Special remarks	Sound level	dB(A)	46		47	48	47	48
	Fan speed	rpm	825		825		825	
	Fan speed regulator		1		1		1	
	Refrigerant filling capacity(R410A)	kg	0.80		0.90		0.90	
	Refrigerating oil (Model)	cc	320 (NEO22)		320 (NEO22)		320 (NEO22)	
	Thermistor RT61(at 0℃)	kΩ	32.6		32.6		32.6	
	Thermistor RT62(at 100℃)	kΩ	13.4		13.4		13.4	
	Thermistor RT64(at 50℃)	kΩ	17		17		17	
	Thermistor RT65(at 25℃)	kΩ	10		10		10	

NOTE : Test conditions are based on ISO 5151
Cooling : Indoor DB 27℃ WB 19℃
Outdoor DB 35℃ WB(24℃)
Heating : Indoor DB 20℃ WB 15℃
Outdoor DB 7℃ WB 6℃
Refrigerant piping length (one way): 5m
✻1 Measured under rated operating frequency

Specifications and rating conditions of main electric parts

OUTDOOR UNIT

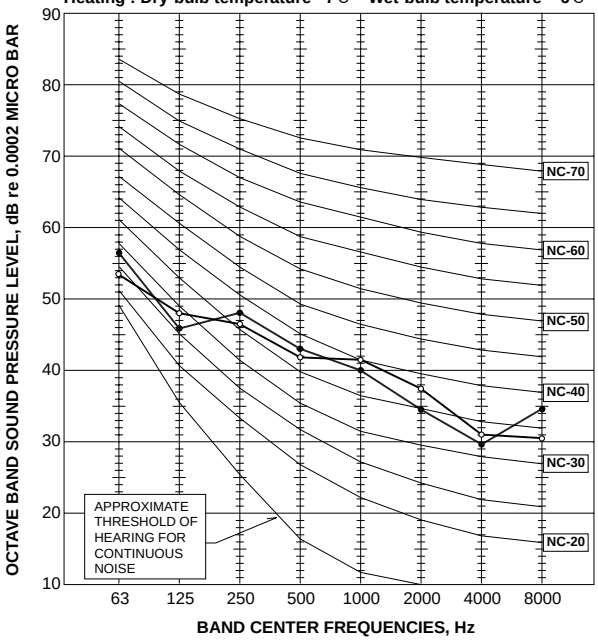
Item \ Model	MUZ-A09YV - E1	MUZ-A09YVH - E1	MUZ-A12YV - E1	MUZ-A12YVH - E1
Current transformer (CT)	ETQ19Z53AY			
Current transformer (CT761, CT781)	ETQ19Z71AY			
Smoothing capacitor (C62A, C62B, C61B)	680μF 420V			
Outdoor fan capacitor (C65)	1.8μF 440V			
Diode module (DB61, DB65)	D25XB60			
Fuse (F61)	250V 20A			
Fuse (F71, F801)	250V 3.15A			
Defrost heater (H)	—	230V 130W	—	230V 130W
Power transistor module (IPM)	PS21244A			
Expansion valve coil (LEV)	CAD-MD12ME 12VDC			
Reactor (L61)	10A 23.0mH			
Current-detecting resistor (R61)	45mΩ 5W		50mΩ 5W (2 elements)	
Current-detecting resistor (R831)	25mΩ 5W			
Current-limiting resistor (R64A, R64B)	5.1Ω 10W			
Solid state relay (SR61)	G3MB			
Terminal block (TB)	3P			
Relay (X63)	G5N-1a/G5NB-1a			
Relay (X64)	G4A-1A-PS			
Relay (X66)	—	G5N-1a/G5NB-1a	—	G5N-1a/G5NB-1a
R.V. coil (21S4)	LD30013			
Heater protector (26H)	—	Open 45℃	—	Open 45℃
Outdoor fan motor thermal fuse	Open 152℃			

4 NOISE CRITERIA CURVES

MUZ-A09YV -E1
MUZ-A09YVH -E1

SPEED	FUNCTION	SPL(dB(A))	LINE
High	COOLING	46	●—●
	HEATING	46	○—○

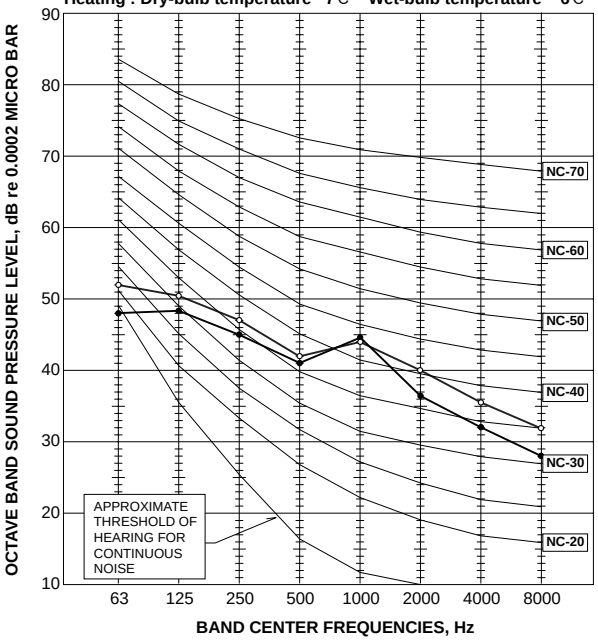
Test conditions,
Cooling : Dry-bulb temperature 35℃ Wet-bulb temperature (24℃)
Heating : Dry-bulb temperature 7℃ Wet-bulb temperature 6℃

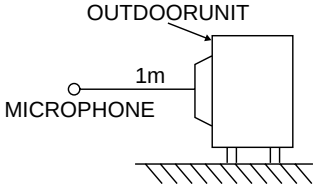


MUZ-A12YV -E1
MUZ-A12YVH -E1

FAN SPEED	FUNCTION	SPL(dB(A))	LINE
High	COOLING	47	●—●
	HEATING	48	○—○

Test conditions,
Cooling : Dry-bulb temperature 35℃ Wet-bulb temperature (24℃)
Heating : Dry-bulb temperature 7℃ Wet-bulb temperature 6℃



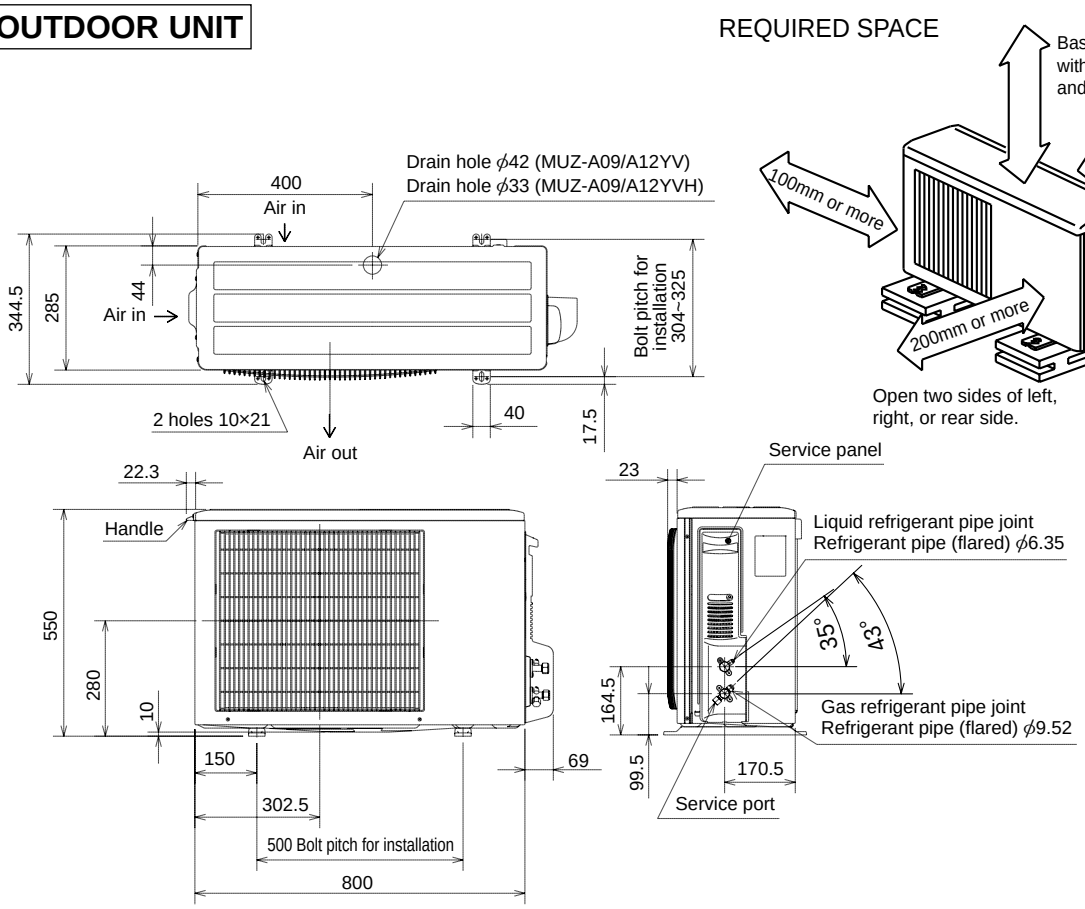


5 OUTLINES AND DIMENSIONS

MUZ-A09YV -E1 MUZ-A12YV -E1
MUZ-A09YVH -E1 MUZ-A12YVH -E1

Unit: mm

OUTDOOR UNIT



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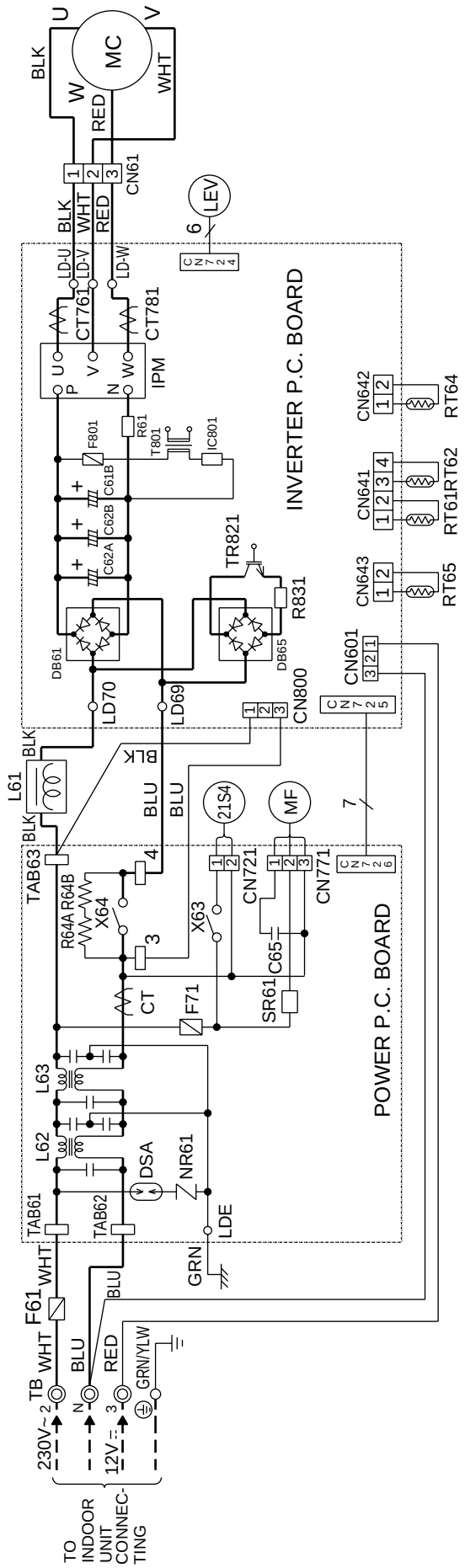
6 WIRING DIAGRAM

MUZ-A09YV -E1
MUZ-A12YV -E1

OUTDOOR UNIT

MODELS WIRING DIAGRAM



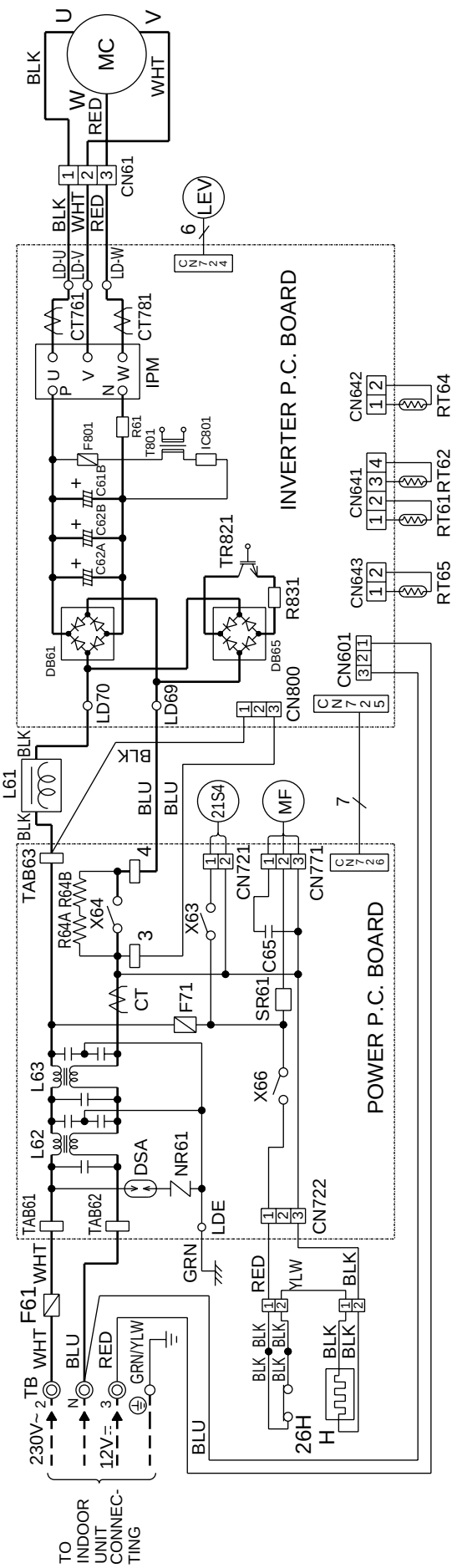
NOTE:1. About the indoor side electric wiring refer to the indoor unit electric wiring diagram for servicing.
2.Use copper conductors only. (For field wiring)
3. Symbols below indicate.
◎: Terminal block, □□□□: Connector

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
CT,CT761,CT781	CURRENT TRANSFORMER	LEV	EXPANSION VALVE COIL	RT65	AMBIENT TEMPERATURE THERMISTOR
C62A,C62B,C61B	SMOOTHING CAPACITOR	L61	REACTOR	R61,R831	CURRENT-DETECTING RESISTOR
C65	OUTDOOR FAN CAPACITOR	L62,L63	CMC COIL	R64A,R64B	CURRENT-LIMITING RESISTOR
DB61,DB65	DIODE MODULE	MC	COMPRESSOR	SR61	SOLID STATE RELAY
DSA	SURGE ABSORBER	MF	OUTDOOR FAN MOTOR (INNER FUSE)	TB	TERMINAL BLOCK
F61	FUSE (20A)	NR61	VARISTOR	TR821	SWITCHING POWER TRANSISTOR
F71,F801	FUSE (3.15A)	RT61	DEFROST THERMISTOR	T801	TRANSFORMER
IC801	INTELLIGENT POWER DEVICE	RT62	DISCHARGE TEMPERATURE THERMISTOR	X63,X64	RELAY
IPM	POWER TRANSISTOR MODULE	RT64	FIN TEMPERATURE THERMISTOR	21S4	R.V. COIL

MUZ-A09YVH -E1
MUZ-A12YVH -E1

OUTDOOR UNIT

MODELS WIRING DIAGRAM



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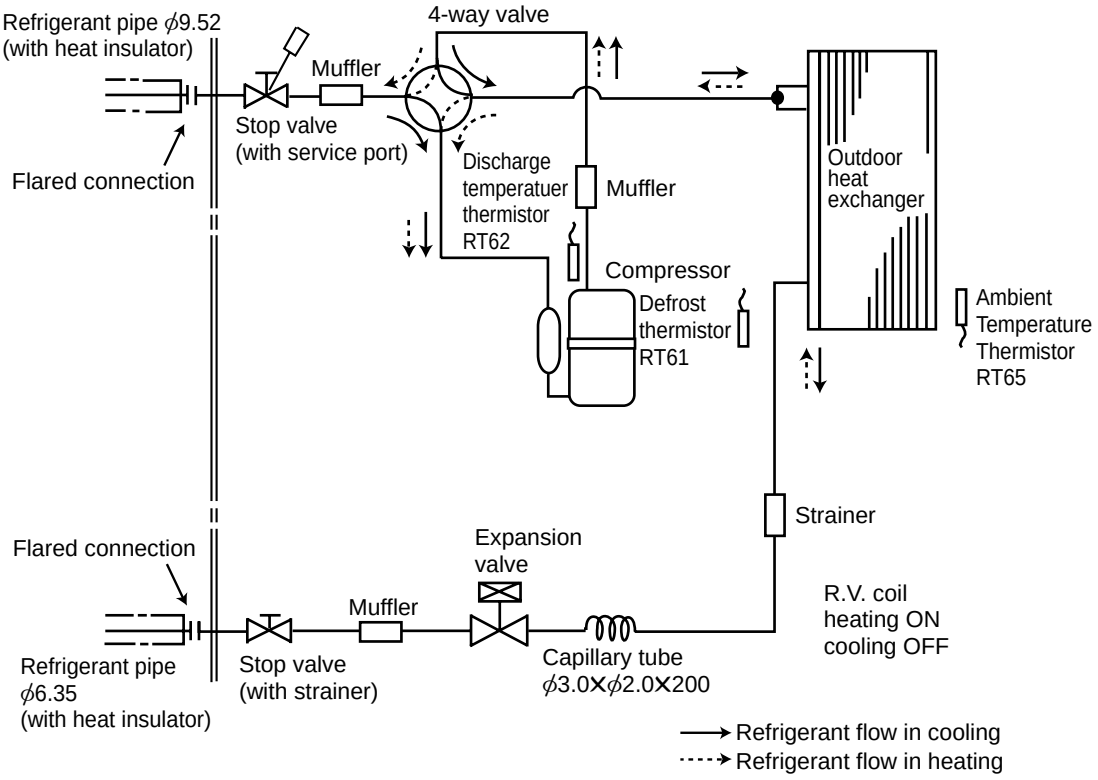
C62A,C62B,C61B	SMOOTHING CAPACITOR	L61	REACTOR	R64A,R64B	CURRENT-LIMITING RESISTOR
C65	OUTDOOR FAN CAPACITOR	L62,L63	CMC COIL	SR61	SOLID STATE RELAY
DB61,DB65	DIODE MODULE	MC	COMPRESSOR	TB	TERMINAL BLOCK
DSA	SURGE ABSORBER	MF	OUTDOOR FAN MOTOR (INNER FUSE)	TR821	SWITCHING POWER TRANSISTOR
F61	FUSE (20A)	NR61	VARISTOR	T801	TRANSFORMER
F71,F801	FUSE (3.15A)	RT61	DEFROST THERMISTOR	X63,X64,X66	RELAY
H	DEFROST HEATER	RT62	DISCHARGE TEMPERATURE THERMISTOR	21S4	R.V. COIL
IC801	INTELLIGENT POWER DEVICE	RT64	FIN TEMPERATURE THERMISTOR	26H	HEATER PROTECTOR
IPM	POWER TRANSISTOR MODULE	RT65	AMBIENT TEMPERATURE THERMISTOR		

7 REFRIGERANT SYSTEM DIAGRAM

MUZ-A09YV -E1
MUZ-A09YVH -E1
MUZ-A12YV -E1
MUZ-A12YVH -E1

Unit:mm

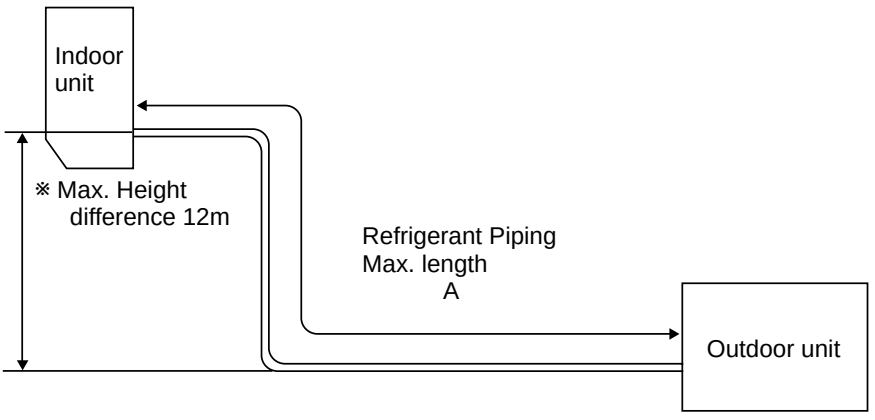
OUTDOOR UNIT



MAX. REFRIGERANT PIPING LENGTH

Model	Refrigerant piping Max. length : m	Piping size O.D : mm		Length of connecting pipe : m	
	A	Gas	Liquid	Indoor unit	Outdoor unit
MUZ-A09YV - E1 **MUZ-A09YVH - E1** **MUZ-A12YV - E1** **MUZ-A12YVH - E1**	20	9.52	6.35	Gas 0.43 Liquid 0.5	———

MAX. HEIGHT DIFFERENCE



※ Height difference should be within 12m regardless of which unit, indoor or outdoor position is high.

ADDITIONAL REFRIGERANT CHARGE (R410A:g)

Model	Outdoor unit precharged	Refrigerant piping length (one way)											
		5m	6m	7m	8m	9m	10m	11m	12m	13m	14m	15m	20m
MUZ-A09YV - E1 **MUZ-A09YVH -** E1	800	0	0	0	90	120	150	180	210	240	270	300	450
MUZ-A12YV - E1 **MUZ-A12YVH -** E1	900	0	0	0	90	120	150	180	210	240	270	300	450

Calculation : Xg=30g/m×(Refrigerant piping length(m) - 5)

8 PERFORMANCE CURVES

MUZ-A09YV -E1 MUZ-A12YV -E1
MUZ-A09YVH -E1 MUZ-A12YVH -E1

The standard data contained in these specifications apply only to the operation of the air conditioner under normal conditions. Since operating conditions vary according to the areas where these units are installed. The following information has been provided to clarify the operating characteristics of the air conditioner under the conditions indicated by the performance curve.

(1) GUARANTEED VOLTAGE

198 ~ 264V, 50Hz

(2) AIR FLOW

Air flow should be set at MAX.

(3) MAIN READINGS

(1) Indoor intake air wet-bulb temperature : °C WB
(2) Indoor outlet air wet-bulb temperature : °C WB
(3) Outdoor intake air dry-bulb temperature : °C DB
(4) Total input: W
} Cooling

(5) Indoor intake air dry-bulb temperature : °C DB
(6) Outdoor intake air wet-bulb temperature : °C WB
(7) Total input : W
} Heating

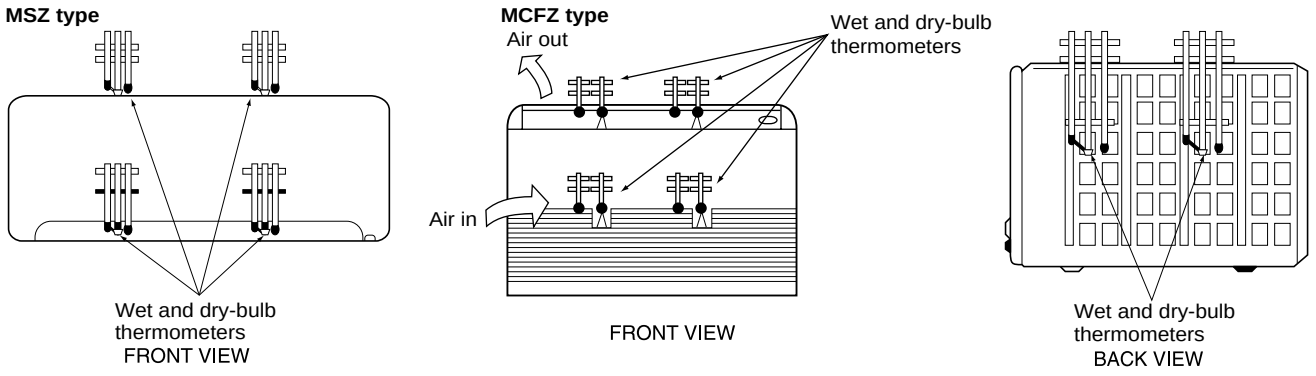
Indoor air wet/dry-bulb temperature difference on the left side of the chart on next page shows the difference between the indoor intake air wet/dry-bulb temperature and the indoor outlet air wet/dry-bulb temperature for your reference at service.

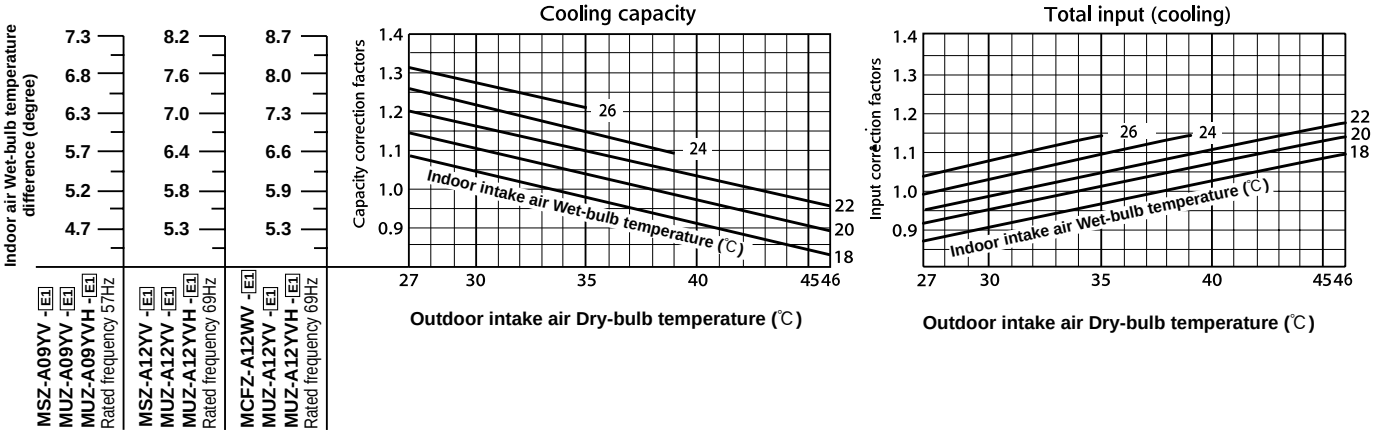
How to measure the indoor air wet-bulb / dry-bulb temperature difference

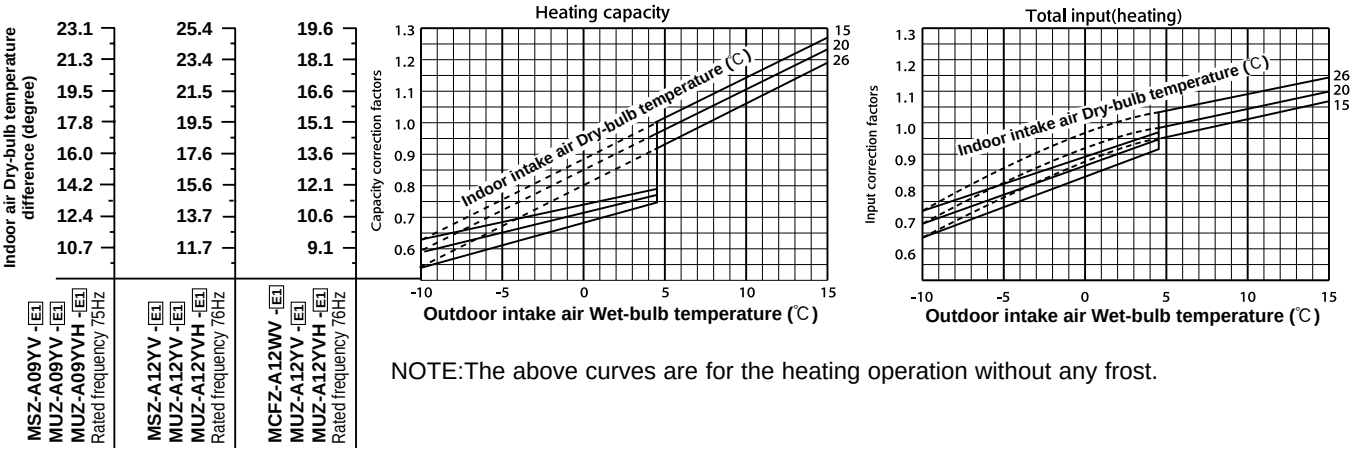
1. Attach at least 2 sets of wet and dry-bulb thermometers to the indoor air intake as shown in the figure, and at least 2 sets of wet and dry-bulb thermometers to the indoor air outlet. The thermometers must be attached to the position where air speed is high.
2. Attach at least 2 sets of wet and dry-bulb thermometers to the outdoor air intake. Cover the thermometers to prevent direct rays of the sun.
3. Check that the air filter is cleaned.
4. Open windows and doors of room.
5. Press the EMERGENCY OPERATION switch once (twice) to start the EMERGENCY COOL (HEAT) MODE.
6. When system stabilizes after more than 15 minutes, measure temperature and take an average temperature.
7. 10 minutes later, measure temperature again and check that the temperature does not change.

INDOOR UNIT

OUTDOOR UNIT

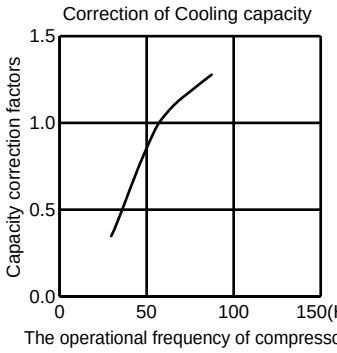




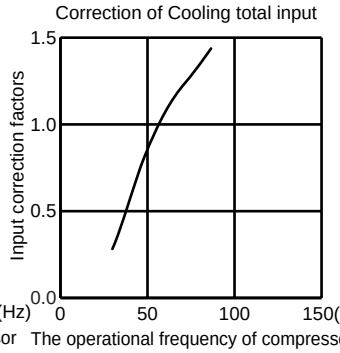


NOTE:The above curves are for the heating operation without any frost.

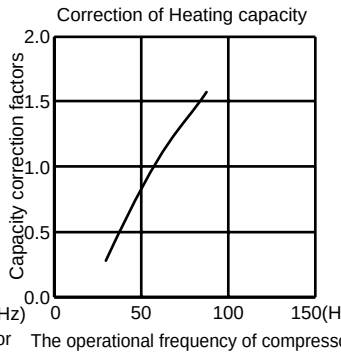
MUZ-A09YV - E1
MUZ-A09YVH - E1



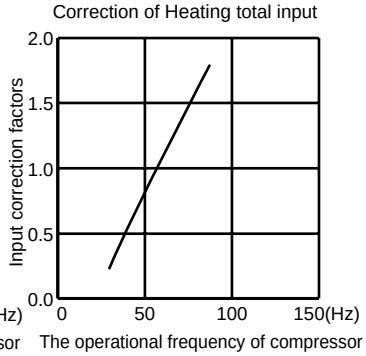
MUZ-A09YV - E1
MUZ-A09YVH - E1



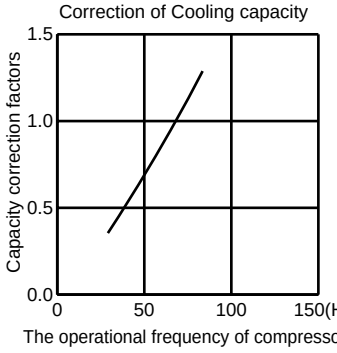
MUZ-A09YV - E1
MUZ-A09YVH - E1



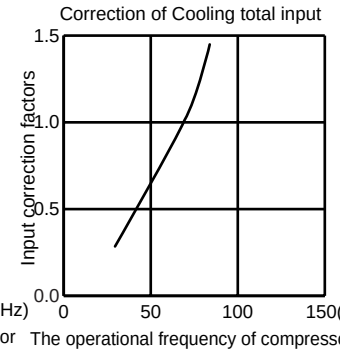
MUZ-A09YV - E1
MUZ-A09YVH - E1



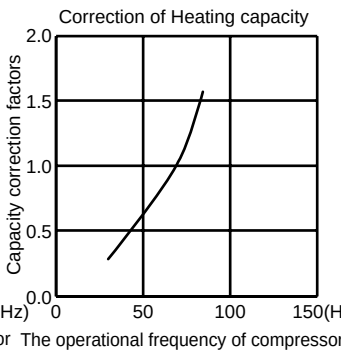
MUZ-A12YV - E1
MUZ-A12YVH - E1
(Indoor unit : MSZ-A12YV - E1)



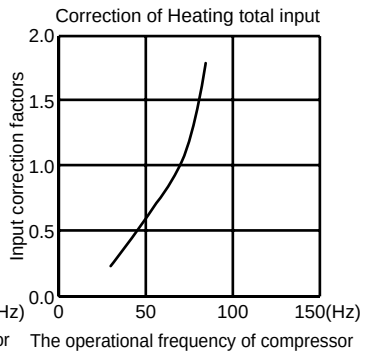
MUZ-A12YV - E1
MUZ-A12YVH - E1
(Indoor unit : MSZ-A12YV - E1)



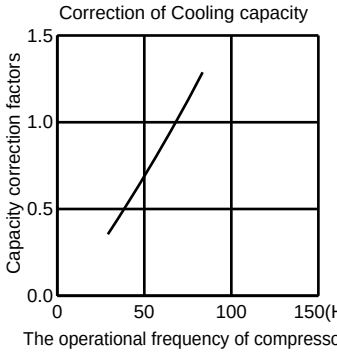
MUZ-A12YV - E1
MUZ-A12YVH - E1
(Indoor unit : MSZ-A12YV - E1)



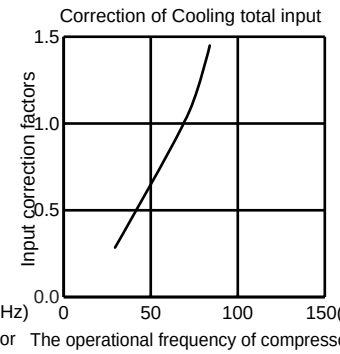
MUZ-A12YV - E1
MUZ-A12YVH - E1
(Indoor unit : MSZ-A12YV - E1)



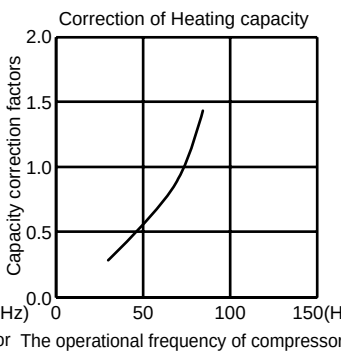
MUZ-A12YV - E1
MUZ-A12YVH - E1
(Indoor unit : MCFZ-A12WV - E1)



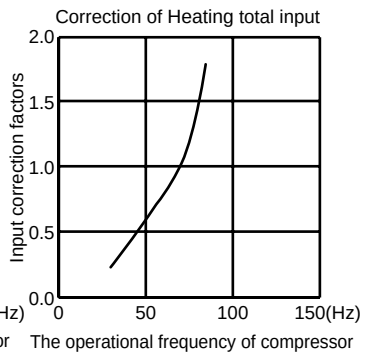
MUZ-A12YV - E1
MUZ-A12YVH - E1
(Indoor unit : MCFZ-A12WV - E1)



MUZ-A12YV - E1
MUZ-A12YVH - E1
(Indoor unit : MCFZ-A12WV - E1)



MUZ-A12YV - E1
MUZ-A12YVH - E1
(Indoor unit : MCFZ-A12WV - E1)



OUTDOOR LOW PRESSURE AND OUTDOOR UNIT CURRENT

<How to operate fixed-frequency operation (Test run operation)>
1. Press the EMERGENCY OPERATION switch to COOL or HEAT mode (COOL : Press once, HEAT : Press twice).
2. Test run operation starts and continue to operate for 30 minutes.
3. Compressor operates at rated frequency in COOL mode or 58Hz in HEAT mode.
4. Indoor fan operates at High speed.
5. After 30 minutes, test run operation finishes and EMERGENCY OPERATION starts (Operation frequency of compressor varies).
6. To cancel test run operation (EMERGENCY OPERATION), press the EMERGENCY OPERATION switch or any button on remote controller.

NOTE : The unit of pressure has been changed to MPa on the international system of units (SI unit system).
The conversion factor is: **1(MPa [Gauge]) =10.2(kgf/㎠ [Gauge])**

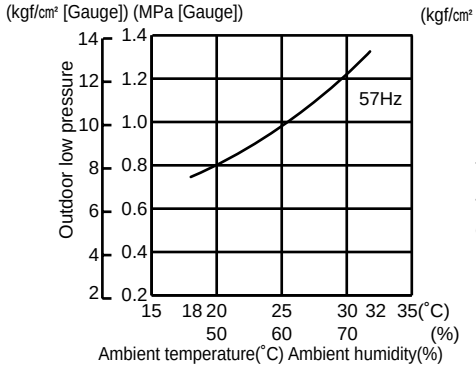
OUTDOOR LOW PRESSURE AND OUTDOOR UNIT CURRENT

COOL operation

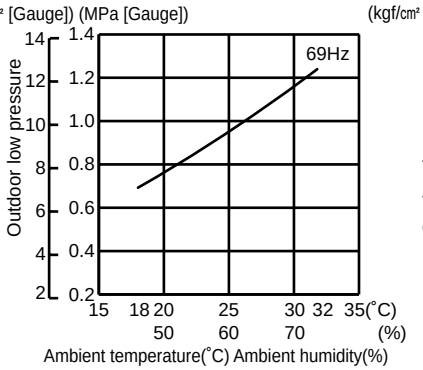
① Both indoor and outdoor unit are under the same temperature/humidity condition.
② Air flow : High speed
③ Operational frequency : 57Hz(MUZ-A09YV, MUZ-A09YVH)
69Hz(MUZ-A12YV, MUZ-A12YVH)

Dry-bulb temperature	Relative humidity(%)
20	50
25	60
30	70

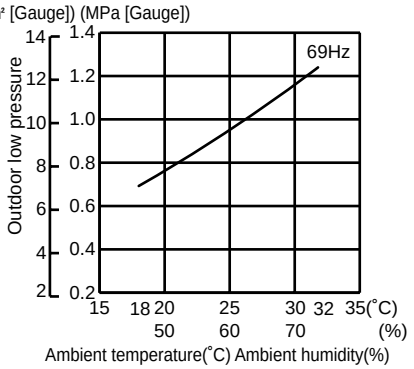
MUZ-A09YV - E1
MUZ-A09YVH - E1



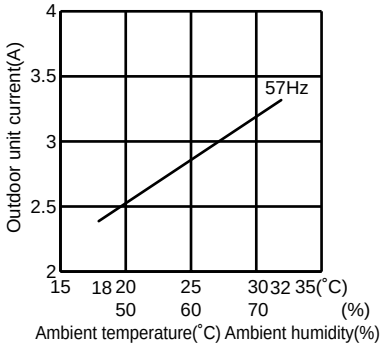
MUZ-A12YV - E1
MUZ-A12YVH - E1
(Indoor unit : MSZ-A12YV - E1)



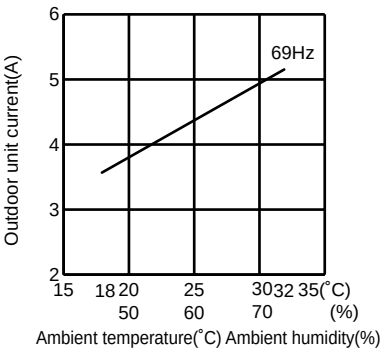
MUZ-A12YV - E1
MUZ-A12YVH - E1
(Indoor unit : MCFZ-A12WV - E1)



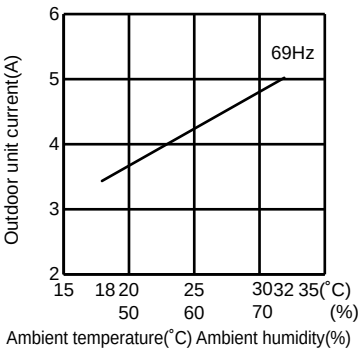
MUZ-A09YV - E1
MUZ-A09YVH - E1



MUZ-A12YV - E1
MUZ-A12YVH - E1
(Indoor unit : MSZ-A12YV - E1)



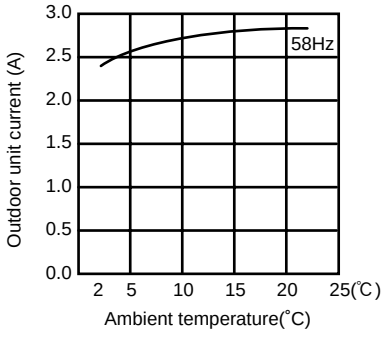
MUZ-A12YV - E1
MUZ-A12YVH - E1
(Indoor unit : MCFZ-A12WV - E1)



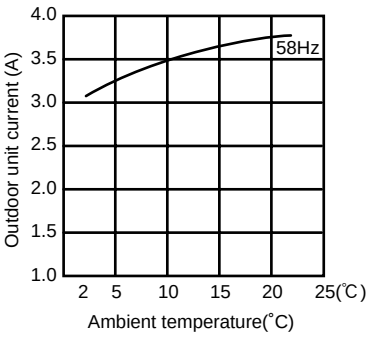
HEAT operation

Condition indoor: Dry bulb temperature 20.0°C
Wet bulb temperature 14.5°C
Condition outdoor: Dry bulb temperature 2,7,15,20.0°C
Wet bulb temperature 1,6,12,14.5°C

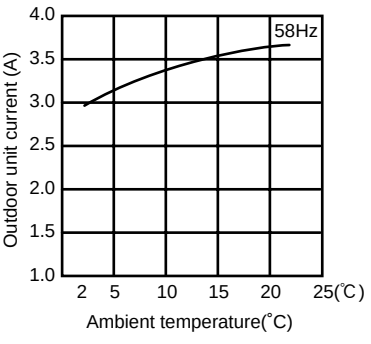
MUZ-A09YV - E1
MUZ-A09YVH - E1



MUZ-A12YV - E1
MUZ-A12YVH - E1
(Indoor unit : MSZ-A12YV - E1)



MUZ-A12YV - E1
MUZ-A12YVH - E1
(Indoor unit : MCFZ-A12WV - E1)



PERFORMANCE DATA COOL operation Rated frequency 57Hz

MSZ-A09YV -E1 : MUZ-A09YV -E1 MUZ-A09YVH -E1

CAPACITY:2.5(kW) SHF:0.79 INPUT:670(W)

		OUTDOOR DB(℃)															
INDOOR DB(℃)	INDOOR WB(℃)	21				25				27				30			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	2.94	1.79	0.61	536	2.81	1.72	0.61	563	2.70	1.65	0.61	590	2.60	1.59	0.61	616
21	20	3.06	1.50	0.49	563	2.94	1.44	0.49	596	2.85	1.40	0.49	610	2.75	1.35	0.49	637
22	18	2.94	1.91	0.65	536	2.81	1.83	0.65	563	2.70	1.76	0.65	590	2.60	1.69	0.65	616
22	20	3.06	1.62	0.53	563	2.94	1.56	0.53	596	2.85	1.51	0.53	610	2.75	1.46	0.53	637
22	22	3.19	1.31	0.41	583	3.08	1.26	0.41	620	3.00	1.23	0.41	637	2.88	1.18	0.41	663
23	18	2.94	2.03	0.69	536	2.81	1.94	0.69	563	2.70	1.86	0.69	590	2.60	1.79	0.69	616
23	20	3.06	1.75	0.57	563	2.94	1.67	0.57	596	2.85	1.62	0.57	610	2.75	1.57	0.57	637
23	22	3.19	1.43	0.45	583	3.08	1.38	0.45	620	3.00	1.35	0.45	637	2.88	1.29	0.45	663
24	18	2.94	2.14	0.73	536	2.81	2.05	0.73	563	2.70	1.97	0.73	590	2.60	1.90	0.73	616
24	20	3.06	1.87	0.61	563	2.94	1.79	0.61	596	2.85	1.74	0.61	610	2.75	1.68	0.61	637
24	22	3.19	1.56	0.49	583	3.08	1.51	0.49	620	3.00	1.47	0.49	637	2.88	1.41	0.49	663
24	24	3.35	1.24	0.37	610	3.23	1.19	0.37	643	3.15	1.17	0.37	663	3.05	1.13	0.37	697
25	18	2.94	2.26	0.77	536	2.81	2.17	0.77	563	2.70	2.08	0.77	590	2.60	2.00	0.77	616
25	20	3.06	1.99	0.65	563	2.94	1.91	0.65	596	2.85	1.85	0.65	610	2.75	1.79	0.65	637
25	22	3.19	1.69	0.53	583	3.08	1.63	0.53	620	3.00	1.59	0.53	637	2.88	1.52	0.53	663
25	24	3.35	1.37	0.41	610	3.23	1.32	0.41	643	3.15	1.29	0.41	663	3.05	1.25	0.41	697
26	18	2.94	2.38	0.81	536	2.81	2.28	0.81	563	2.70	2.19	0.81	590	2.60	2.11	0.81	616
26	20	3.06	2.11	0.69	563	2.94	2.03	0.69	596	2.85	1.97	0.69	610	2.75	1.90	0.69	637
26	22	3.19	1.82	0.57	583	3.08	1.75	0.57	620	3.00	1.71	0.57	637	2.88	1.64	0.57	663
26	24	3.35	1.51	0.45	610	3.23	1.45	0.45	643	3.15	1.42	0.45	663	3.05	1.37	0.45	697
26	26	3.45	1.14	0.33	643	3.35	1.11	0.33	677	3.30	1.09	0.33	697	3.20	1.06	0.33	717
27	18	2.94	2.50	0.85	536	2.81	2.39	0.85	563	2.70	2.30	0.85	590	2.60	2.21	0.85	616
27	20	3.06	2.24	0.73	563	2.94	2.14	0.73	596	2.85	2.08	0.73	610	2.75	2.01	0.73	637
27	22	3.19	1.94	0.61	583	3.08	1.88	0.61	620	3.00	1.83	0.61	637	2.88	1.75	0.61	663
27	24	3.35	1.64	0.49	610	3.23	1.58	0.49	643	3.15	1.54	0.49	663	3.05	1.49	0.49	697
27	26	3.45	1.28	0.37	643	3.35	1.24	0.37	677	3.30	1.22	0.37	697	3.20	1.18	0.37	717
28	18	2.94	2.61	0.89	536	2.81	2.50	0.89	563	2.70	2.40	0.89	590	2.60	2.31	0.89	616
28	20	3.06	2.36	0.77	563	2.94	2.26	0.77	596	2.85	2.19	0.77	610	2.75	2.12	0.77	637
28	22	3.19	2.07	0.65	583	3.08	2.00	0.65	620	3.00	1.95	0.65	637	2.88	1.87	0.65	663
28	24	3.35	1.78	0.53	610	3.23	1.71	0.53	643	3.15	1.67	0.53	663	3.05	1.62	0.53	697
28	26	3.45	1.41	0.41	643	3.35	1.37	0.41	677	3.30	1.35	0.41	697	3.20	1.31	0.41	717
29	18	2.94	2.73	0.93	536	2.81	2.62	0.93	563	2.70	2.51	0.93	590	2.60	2.42	0.93	616
29	20	3.06	2.48	0.81	563	2.94	2.38	0.81	596	2.85	2.31	0.81	610	2.75	2.23	0.81	637
29	22	3.19	2.20	0.69	583	3.08	2.12	0.69	620	3.00	2.07	0.69	637	2.88	1.98	0.69	663
29	24	3.35	1.91	0.57	610	3.23	1.84	0.57	643	3.15	1.80	0.57	663	3.05	1.74	0.57	697
29	26	3.45	1.55	0.45	643	3.35	1.51	0.45	677	3.30	1.49	0.45	697	3.20	1.44	0.45	717
30	18	2.94	2.85	0.97	536	2.81	2.73	0.97	563	2.70	2.62	0.97	590	2.60	2.52	0.97	616
30	20	3.06	2.60	0.85	563	2.94	2.50	0.85	596	2.85	2.42	0.85	610	2.75	2.34	0.85	637
30	22	3.19	2.33	0.73	583	3.08	2.24	0.73	620	3.00	2.19	0.73	637	2.88	2.10	0.73	663
30	24	3.35	2.04	0.61	610	3.23	1.97	0.61	643	3.15	1.92	0.61	663	3.05	1.86	0.61	697
30	26	3.45	1.69	0.49	643	3.35	1.64	0.49	677	3.30	1.62	0.49	697	3.20	1.57	0.49	717
31	18	2.94	2.97	1.01	536	2.81	2.84	1.01	563	2.70	2.73	1.01	590	2.60	2.63	1.01	616
31	20	3.06	2.73	0.89	563	2.94	2.61	0.89	596	2.85	2.54	0.89	610	2.75	2.45	0.89	637
31	22	3.19	2.45	0.77	583	3.08	2.37	0.77	620	3.00	2.31	0.77	637	2.88	2.21	0.77	663
31	24	3.35	2.18	0.65	610	3.23	2.10	0.65	643	3.15	2.05	0.65	663	3.05	1.98	0.65	697
31	26	3.45	1.83	0.53	643	3.35	1.78	0.53	677	3.30	1.75	0.53	697	3.20	1.70	0.53	717
32	18	2.94	3.08	1.05	536	2.81	2.95	1.05	563	2.70	2.84	1.05	590	2.60	2.73	1.05	616
32	20	3.06	2.85	0.93	563	2.94	2.73	0.93	596	2.85	2.65	0.93	610	2.75	2.56	0.93	637
32	22	3.19	2.58	0.81	583	3.08	2.49	0.81	620	3.00	2.43	0.81	637	2.88	2.33	0.81	663
32	24	3.35	2.31	0.69	610	3.23	2.23	0.69	643	3.15	2.17	0.69	663	3.05	2.10	0.69	697
32	26	3.45	1.97	0.57	643	3.35	1.91	0.57	677	3.30	1.88	0.57	697	3.20	1.82	0.57	717

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation Rated frequency 57Hz

MSZ-A09YV -E1 : MUZ-A09YV -E1 MUZ-A09YVH -E1

CAPACITY:2.5(kW) SHF:0.79 INPUT:670(W)

		OUTDOOR DB(℃)											
INDOOR DB (℃)	INDOOR WB (℃)	35				40				46			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	2.45	1.49	0.61	657	2.25	1.37	0.61	697	2.08	1.27	0.61	724
21	20	2.58	1.26	0.49	683	2.40	1.18	0.49	717	2.23	1.09	0.49	757
22	18	2.45	1.59	0.65	657	2.25	1.46	0.65	697	2.08	1.35	0.65	724
22	20	2.58	1.36	0.53	683	2.40	1.27	0.53	717	2.23	1.18	0.53	757
22	22	2.73	1.12	0.41	710	2.55	1.05	0.41	750	2.38	0.97	0.41	777
23	18	2.45	1.69	0.69	657	2.25	1.55	0.69	697	2.08	1.43	0.69	724
23	20	2.58	1.47	0.57	683	2.40	1.37	0.57	717	2.23	1.27	0.57	757
23	22	2.73	1.23	0.45	710	2.55	1.15	0.45	750	2.38	1.07	0.45	777
24	18	2.45	1.79	0.73	657	2.25	1.64	0.73	697	2.08	1.51	0.73	724
24	20	2.58	1.57	0.61	683	2.40	1.46	0.61	717	2.23	1.36	0.61	757
24	22	2.73	1.34	0.49	710	2.55	1.25	0.49	750	2.38	1.16	0.49	777
24	24	2.88	1.06	0.37	737	2.70	1.00	0.37	771	2.55	0.94	0.37	804
25	18	2.45	1.89	0.77	657	2.25	1.73	0.77	697	2.08	1.60	0.77	724
25	20	2.58	1.67	0.65	683	2.40	1.56	0.65	717	2.23	1.45	0.65	757
25	22	2.73	1.44	0.53	710	2.55	1.35	0.53	750	2.38	1.26	0.53	777
25	24	2.88	1.18	0.41	737	2.70	1.11	0.41	771	2.55	1.05	0.41	804
26	18	2.45	1.98	0.81	657	2.25	1.82	0.81	697	2.08	1.68	0.81	724
26	20	2.58	1.78	0.69	683	2.40	1.66	0.69	717	2.23	1.54	0.69	757
26	22	2.73	1.55	0.57	710	2.55	1.45	0.57	750	2.38	1.35	0.57	777
26	24	2.88	1.29	0.45	737	2.70	1.22	0.45	771	2.55	1.15	0.45	804
26	26	3.03	1.00	0.33	764	2.85	0.94	0.33	797	2.68	0.88	0.33	831
27	18	2.45	2.08	0.85	657	2.25	1.91	0.85	697	2.08	1.76	0.85	724
27	20	2.58	1.88	0.73	683	2.40	1.75	0.73	717	2.23	1.62	0.73	757
27	22	2.73	1.66	0.61	710	2.55	1.56	0.61	750	2.38	1.45	0.61	777
27	24	2.88	1.41	0.49	737	2.70	1.32	0.49	771	2.55	1.25	0.49	804
27	26	3.03	1.12	0.37	764	2.85	1.05	0.37	797	2.68	0.99	0.37	831
28	18	2.45	2.18	0.89	657	2.25	2.00	0.89	697	2.08	1.85	0.89	724
28	20	2.58	1.98	0.77	683	2.40	1.85	0.77	717	2.23	1.71	0.77	757
28	22	2.73	1.77	0.65	710	2.55	1.66	0.65	750	2.38	1.54	0.65	777
28	24	2.88	1.52	0.53	737	2.70	1.43	0.53	771	2.55	1.35	0.53	804
28	26	3.03	1.24	0.41	764	2.85	1.17	0.41	797	2.68	1.10	0.41	831
29	18	2.45	2.28	0.93	657	2.25	2.09	0.93	697	2.08	1.93	0.93	724
29	20	2.58	2.09	0.81	683	2.40	1.94	0.81	717	2.23	1.80	0.81	757
29	22	2.73	1.88	0.69	710	2.55	1.76	0.69	750	2.38	1.64	0.69	777
29	24	2.88	1.64	0.57	737	2.70	1.54	0.57	771	2.55	1.45	0.57	804
29	26	3.03	1.36	0.45	764	2.85	1.28	0.45	797	2.68	1.20	0.45	831
30	18	2.45	2.38	0.97	657	2.25	2.18	0.97	697	2.08	2.01	0.97	724
30	20	2.58	2.19	0.85	683	2.40	2.04	0.85	717	2.23	1.89	0.85	757
30	22	2.73	1.99	0.73	710	2.55	1.86	0.73	750	2.38	1.73	0.73	777
30	24	2.88	1.75	0.61	737	2.70	1.65	0.61	771	2.55	1.56	0.61	804
30	26	3.03	1.48	0.49	764	2.85	1.40	0.49	797	2.68	1.31	0.49	831
31	18	2.45	2.47	1.01	657	2.25	2.27	1.01	697	2.08	2.10	1.01	724
31	20	2.58	2.29	0.89	683	2.40	2.14	0.89	717	2.23	1.98	0.89	757
31	22	2.73	2.10	0.77	710	2.55	1.96	0.77	750	2.38	1.83	0.77	777
31	24	2.88	1.87	0.65	737	2.70	1.76	0.65	771	2.55	1.66	0.65	804
31	26	3.03	1.60	0.53	764	2.85	1.51	0.53	797	2.68	1.42	0.53	831
32	18	2.45	2.57	1.05	657	2.25	2.36	1.05	697	2.08	2.18	1.05	724
32	20	2.58	2.39	0.93	683	2.40	2.23	0.93	717	2.23	2.07	0.93	757
32	22	2.73	2.21	0.81	710	2.55	2.07	0.81	750	2.38	1.92	0.81	777
32	24	2.88	1.98	0.69	737	2.70	1.86	0.69	771	2.55	1.76	0.69	804
32	26	3.03	1.72	0.57	764	2.85	1.62	0.57	797	2.68	1.52	0.57	831

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation Rated frequency 69Hz

MSZ-A12YV -E1 MCFZ-A12WV -E1 : MUZ-A12YV -E1 MUZ-A12YVH -E1

CAPACITY:3.5(kW) SHF:0.76 INPUT:1090(W)

		OUTDOOR DB(℃)															
INDOOR DB(℃)	INDOOR WB(℃)	21				25				27				30			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	4.11	2.39	0.58	872	3.94	2.28	0.58	916	3.78	2.19	0.58	959	3.64	2.11	0.58	1003
21	20	4.29	1.97	0.46	916	4.11	1.89	0.46	970	3.99	1.84	0.46	992	3.85	1.77	0.46	1036
22	18	4.11	2.55	0.62	872	3.94	2.44	0.62	916	3.78	2.34	0.62	959	3.64	2.26	0.62	1003
22	20	4.29	2.14	0.50	916	4.11	2.06	0.50	970	3.99	2.00	0.50	992	3.85	1.93	0.50	1036
22	22	4.46	1.70	0.38	948	4.31	1.64	0.38	1008	4.20	1.60	0.38	1036	4.03	1.53	0.38	1079
23	18	4.11	2.71	0.66	872	3.94	2.60	0.66	916	3.78	2.49	0.66	959	3.64	2.40	0.66	1003
23	20	4.29	2.32	0.54	916	4.11	2.22	0.54	970	3.99	2.15	0.54	992	3.85	2.08	0.54	1036
23	22	4.46	1.87	0.42	948	4.31	1.81	0.42	1008	4.20	1.76	0.42	1036	4.03	1.69	0.42	1079
24	18	4.11	2.88	0.70	872	3.94	2.76	0.70	916	3.78	2.65	0.70	959	3.64	2.55	0.70	1003
24	20	4.29	2.49	0.58	916	4.11	2.39	0.58	970	3.99	2.31	0.58	992	3.85	2.23	0.58	1036
24	22	4.46	2.05	0.46	948	4.31	1.98	0.46	1008	4.20	1.93	0.46	1036	4.03	1.85	0.46	1079
24	24	4.69	1.59	0.34	992	4.52	1.54	0.34	1046	4.41	1.50	0.34	1079	4.27	1.45	0.34	1134
25	18	4.11	3.04	0.74	872	3.94	2.91	0.74	916	3.78	2.80	0.74	959	3.64	2.69	0.74	1003
25	20	4.29	2.66	0.62	916	4.11	2.55	0.62	970	3.99	2.47	0.62	992	3.85	2.39	0.62	1036
25	22	4.46	2.23	0.50	948	4.31	2.15	0.50	1008	4.20	2.10	0.50	1036	4.03	2.01	0.50	1079
25	24	4.69	1.78	0.38	992	4.52	1.72	0.38	1046	4.41	1.68	0.38	1079	4.27	1.62	0.38	1134
26	18	4.11	3.21	0.78	872	3.94	3.07	0.78	916	3.78	2.95	0.78	959	3.64	2.84	0.78	1003
26	20	4.29	2.83	0.66	916	4.11	2.71	0.66	970	3.99	2.63	0.66	992	3.85	2.54	0.66	1036
26	22	4.46	2.41	0.54	948	4.31	2.32	0.54	1008	4.20	2.27	0.54	1036	4.03	2.17	0.54	1079
26	24	4.69	1.97	0.42	992	4.52	1.90	0.42	1046	4.41	1.85	0.42	1079	4.27	1.79	0.42	1134
26	26	4.83	1.45	0.30	1046	4.69	1.41	0.30	1101	4.62	1.39	0.30	1134	4.48	1.34	0.30	1166
27	18	4.11	3.37	0.82	872	3.94	3.23	0.82	916	3.78	3.10	0.82	959	3.64	2.98	0.82	1003
27	20	4.29	3.00	0.70	916	4.11	2.88	0.70	970	3.99	2.79	0.70	992	3.85	2.70	0.70	1036
27	22	4.46	2.59	0.58	948	4.31	2.50	0.58	1008	4.20	2.44	0.58	1036	4.03	2.33	0.58	1079
27	24	4.69	2.16	0.46	992	4.52	2.08	0.46	1046	4.41	2.03	0.46	1079	4.27	1.96	0.46	1134
27	26	4.83	1.64	0.34	1046	4.69	1.59	0.34	1101	4.62	1.57	0.34	1134	4.48	1.52	0.34	1166
28	18	4.11	3.54	0.86	872	3.94	3.39	0.86	916	3.78	3.25	0.86	959	3.64	3.13	0.86	1003
28	20	4.29	3.17	0.74	916	4.11	3.04	0.74	970	3.99	2.95	0.74	992	3.85	2.85	0.74	1036
28	22	4.46	2.77	0.62	948	4.31	2.67	0.62	1008	4.20	2.60	0.62	1036	4.03	2.50	0.62	1079
28	24	4.69	2.35	0.50	992	4.52	2.26	0.50	1046	4.41	2.21	0.50	1079	4.27	2.14	0.50	1134
28	26	4.83	1.84	0.38	1046	4.69	1.78	0.38	1101	4.62	1.76	0.38	1134	4.48	1.70	0.38	1166
29	18	4.11	3.70	0.90	872	3.94	3.54	0.90	916	3.78	3.40	0.90	959	3.64	3.28	0.90	1003
29	20	4.29	3.34	0.78	916	4.11	3.21	0.78	970	3.99	3.11	0.78	992	3.85	3.00	0.78	1036
29	22	4.46	2.95	0.66	948	4.31	2.84	0.66	1008	4.20	2.77	0.66	1036	4.03	2.66	0.66	1079
29	24	4.69	2.53	0.54	992	4.52	2.44	0.54	1046	4.41	2.38	0.54	1079	4.27	2.31	0.54	1134
29	26	4.83	2.03	0.42	1046	4.69	1.97	0.42	1101	4.62	1.94	0.42	1134	4.48	1.88	0.42	1166
30	18	4.11	3.87	0.94	872	3.94	3.70	0.94	916	3.78	3.55	0.94	959	3.64	3.42	0.94	1003
30	20	4.29	3.52	0.82	916	4.11	3.37	0.82	970	3.99	3.27	0.82	992	3.85	3.16	0.82	1036
30	22	4.46	3.12	0.70	948	4.31	3.01	0.70	1008	4.20	2.94	0.70	1036	4.03	2.82	0.70	1079
30	24	4.69	2.72	0.58	992	4.52	2.62	0.58	1046	4.41	2.56	0.58	1079	4.27	2.48	0.58	1134
30	26	4.83	2.22	0.46	1046	4.69	2.16	0.46	1101	4.62	2.13	0.46	1134	4.48	2.06	0.46	1166
31	18	4.11	4.03	0.98	872	3.94	3.86	0.98	916	3.78	3.70	0.98	959	3.64	3.57	0.98	1003
31	20	4.29	3.69	0.86	916	4.11	3.54	0.86	970	3.99	3.43	0.86	992	3.85	3.31	0.86	1036
31	22	4.46	3.30	0.74	948	4.31	3.19	0.74	1008	4.20	3.11	0.74	1036	4.03	2.98	0.74	1079
31	24	4.69	2.91	0.62	992	4.52	2.80	0.62	1046	4.41	2.73	0.62	1079	4.27	2.65	0.62	1134
31	26	4.83	2.42	0.50	1046	4.69	2.35	0.50	1101	4.62	2.31	0.50	1134	4.48	2.24	0.50	1166
32	18	4.11	4.19	1.02	872	3.94	4.02	1.02	916	3.78	3.86	1.02	959	3.64	3.71	1.02	1003
32	20	4.29	3.86	0.90	916	4.11	3.70	0.90	970	3.99	3.59	0.90	992	3.85	3.47	0.90	1036
32	22	4.46	3.48	0.78	948	4.31	3.36	0.78	1008	4.20	3.28	0.78	1036	4.03	3.14	0.78	1079
32	24	4.69	3.10	0.66	992	4.52	2.98	0.66	1046	4.41	2.91	0.66	1079	4.27	2.82	0.66	1134
32	26	4.83	2.61	0.54	1046	4.69	2.53	0.54	1101	4.62	2.49	0.54	1134	4.48	2.42	0.54	1166

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation Rated frequency 69Hz

MSZ-A12YV -E1 MCFZ-A12WV -E1 : MUZ-A12YV -E1 MUZ-A12YVH -E1

CAPACITY:3.5(kW) SHF:0.76 INPUT:1090(W)

		OUTDOOR DB(℃)											
INDOOR DB (℃)	INDOOR WB (℃)	35				40				46			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	3.43	1.99	0.58	1068	3.15	1.83	0.58	1134	2.91	1.68	0.58	1177
21	20	3.61	1.66	0.46	1112	3.36	1.55	0.46	1166	3.12	1.43	0.46	1232
22	18	3.43	2.13	0.62	1068	3.15	1.95	0.62	1134	2.91	1.80	0.62	1177
22	20	3.61	1.80	0.50	1112	3.36	1.68	0.50	1166	3.12	1.56	0.50	1232
22	22	3.82	1.45	0.38	1155	3.57	1.36	0.38	1221	3.33	1.26	0.38	1264
23	18	3.43	2.26	0.66	1068	3.15	2.08	0.66	1134	2.91	1.92	0.66	1177
23	20	3.61	1.95	0.54	1112	3.36	1.81	0.54	1166	3.12	1.68	0.54	1232
23	22	3.82	1.60	0.42	1155	3.57	1.50	0.42	1221	3.33	1.40	0.42	1264
24	18	3.43	2.40	0.70	1068	3.15	2.21	0.70	1134	2.91	2.03	0.70	1177
24	20	3.61	2.09	0.58	1112	3.36	1.95	0.58	1166	3.12	1.81	0.58	1232
24	22	3.82	1.75	0.46	1155	3.57	1.64	0.46	1221	3.33	1.53	0.46	1264
24	24	4.03	1.37	0.34	1199	3.78	1.29	0.34	1254	3.57	1.21	0.34	1308
25	18	3.43	2.54	0.74	1068	3.15	2.33	0.74	1134	2.91	2.15	0.74	1177
25	20	3.61	2.24	0.62	1112	3.36	2.08	0.62	1166	3.12	1.93	0.62	1232
25	22	3.82	1.91	0.50	1155	3.57	1.79	0.50	1221	3.33	1.66	0.50	1264
25	24	4.03	1.53	0.38	1199	3.78	1.44	0.38	1254	3.57	1.36	0.38	1308
26	18	3.43	2.68	0.78	1068	3.15	2.46	0.78	1134	2.91	2.27	0.78	1177
26	20	3.61	2.38	0.66	1112	3.36	2.22	0.66	1166	3.12	2.06	0.66	1232
26	22	3.82	2.06	0.54	1155	3.57	1.93	0.54	1221	3.33	1.80	0.54	1264
26	24	4.03	1.69	0.42	1199	3.78	1.59	0.42	1254	3.57	1.50	0.42	1308
26	26	4.24	1.27	0.30	1243	3.99	1.20	0.30	1297	3.75	1.12	0.30	1352
27	18	3.43	2.81	0.82	1068	3.15	2.58	0.82	1134	2.91	2.38	0.82	1177
27	20	3.61	2.52	0.70	1112	3.36	2.35	0.70	1166	3.12	2.18	0.70	1232
27	22	3.82	2.21	0.58	1155	3.57	2.07	0.58	1221	3.33	1.93	0.58	1264
27	24	4.03	1.85	0.46	1199	3.78	1.74	0.46	1254	3.57	1.64	0.46	1308
27	26	4.24	1.44	0.34	1243	3.99	1.36	0.34	1297	3.75	1.27	0.34	1352
28	18	3.43	2.95	0.86	1068	3.15	2.71	0.86	1134	2.91	2.50	0.86	1177
28	20	3.61	2.67	0.74	1112	3.36	2.49	0.74	1166	3.12	2.31	0.74	1232
28	22	3.82	2.37	0.62	1155	3.57	2.21	0.62	1221	3.33	2.06	0.62	1264
28	24	4.03	2.01	0.50	1199	3.78	1.89	0.50	1254	3.57	1.79	0.50	1308
28	26	4.24	1.61	0.38	1243	3.99	1.52	0.38	1297	3.75	1.42	0.38	1352
29	18	3.43	3.09	0.90	1068	3.15	2.84	0.90	1134	2.91	2.61	0.90	1177
29	20	3.61	2.81	0.78	1112	3.36	2.62	0.78	1166	3.12	2.43	0.78	1232
29	22	3.82	2.52	0.66	1155	3.57	2.36	0.66	1221	3.33	2.19	0.66	1264
29	24	4.03	2.17	0.54	1199	3.78	2.04	0.54	1254	3.57	1.93	0.54	1308
29	26	4.24	1.78	0.42	1243	3.99	1.68	0.42	1297	3.75	1.57	0.42	1352
30	18	3.43	3.22	0.94	1068	3.15	2.96	0.94	1134	2.91	2.73	0.94	1177
30	20	3.61	2.96	0.82	1112	3.36	2.76	0.82	1166	3.12	2.55	0.82	1232
30	22	3.82	2.67	0.70	1155	3.57	2.50	0.70	1221	3.33	2.33	0.70	1264
30	24	4.03	2.33	0.58	1199	3.78	2.19	0.58	1254	3.57	2.07	0.58	1308
30	26	4.24	1.95	0.46	1243	3.99	1.84	0.46	1297	3.75	1.72	0.46	1352
31	18	3.43	3.36	0.98	1068	3.15	3.09	0.98	1134	2.91	2.85	0.98	1177
31	20	3.61	3.10	0.86	1112	3.36	2.89	0.86	1166	3.12	2.68	0.86	1232
31	22	3.82	2.82	0.74	1155	3.57	2.64	0.74	1221	3.33	2.46	0.74	1264
31	24	4.03	2.50	0.62	1199	3.78	2.34	0.62	1254	3.57	2.21	0.62	1308
31	26	4.24	2.12	0.50	1243	3.99	2.00	0.50	1297	3.75	1.87	0.50	1352
32	18	3.43	3.50	1.02	1068	3.15	3.21	1.02	1134	2.91	2.96	1.02	1177
32	20	3.61	3.24	0.90	1112	3.36	3.02	0.90	1166	3.12	2.80	0.90	1232
32	22	3.82	2.98	0.78	1155	3.57	2.78	0.78	1221	3.33	2.59	0.78	1264
32	24	4.03	2.66	0.66	1199	3.78	2.49	0.66	1254	3.57	2.36	0.66	1308
32	26	4.24	2.29	0.54	1243	3.99	2.15	0.54	1297	3.75	2.02	0.54	1352

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA HEAT operation

MSZ-A09YV -E1 : MUZ-A09YV -E1 MUZ-A09YVH -E1 Rated frequency 75Hz

CAPACITY:3.2(kW) INPUT:840(W)

INDOOR DB(℃)	OUTDOOR WB(℃)													
	-10		-5		0		5		10		15		20	
	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	2.02	546	2.43	655	2.85	739	3.26	798	3.68	848	4.06	874	4.48	890
21	1.92	588	2.30	697	2.72	773	3.10	832	3.52	874	3.90	899	4.30	932
26	1.73	630	2.14	739	2.53	815	2.94	874	3.36	916	3.74	941	4.16	966

NOTE Q:Total capacity (kW) INPUT:Total power input (W) DB : Dry-bulb temperature WB : Wet-bulb temperature

MSZ-A12YV -E1 : MUZ-A12YV -E1 MUZ-A12YVH -E1 Rated frequency 76Hz

CAPACITY:4.0(kW) INPUT:1080(W)

INDOOR DB(℃)	OUTDOOR WB(℃)													
	-10		-5		0		5		10		15		20	
	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	2.52	702	3.04	842	3.56	950	4.08	1026	4.60	1091	5.08	1123	5.60	1145
21	2.40	756	2.88	896	3.40	994	3.88	1069	4.40	1123	4.88	1156	5.38	1199
26	2.16	810	2.68	950	3.16	1048	3.68	1123	4.20	1177	4.68	1210	5.20	1242

NOTE Q:Total capacity (kW) INPUT:Total power input (W) DB : Dry-bulb temperature WB : Wet-bulb temperature

MCFZ-A12WV -E1: MUZ-A12YV -E1 MUZ-A12YVH -E1 Rated frequency 76Hz

CAPACITY:3.9(kW) INPUT:1080(W)

INDOOR DB(℃)	OUTDOOR WB(℃)													
	-10		-5		0		5		10		15		20	
	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	2.46	702	2.96	842	3.47	950	3.98	1026	4.49	1091	4.95	1123	5.46	1145
21	2.34	756	2.81	896	3.32	994	3.78	1069	4.29	1123	4.76	1156	5.25	1199
26	2.11	810	2.61	950	3.08	1048	3.59	1123	4.10	1177	4.56	1210	5.07	1242

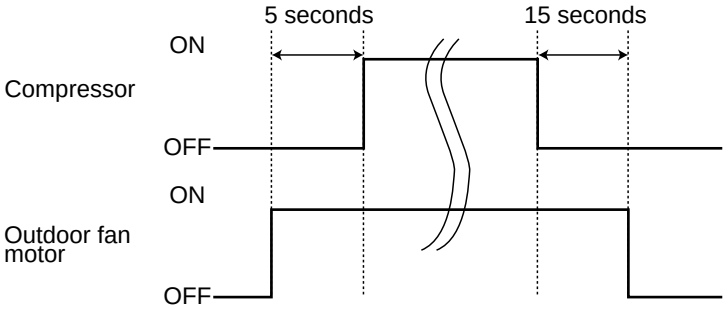
NOTE Q:Total capacity (kW) INPUT:Total power input (W) DB : Dry-bulb temperature WB : Wet-bulb temperature

9 ACTUATOR CONTROL

MUZ-A09YV -E1 MUZ-A12YV -E1
MUZ-A09YVH -E1 MUZ-A12YVH -E1

9-1. Outdoor fan motor control

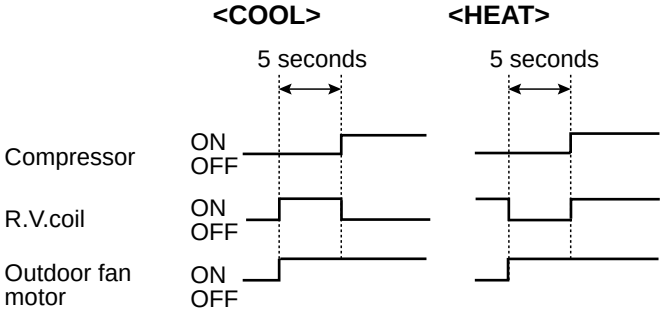
The AC fan motor turns ON/OFF, interlocking with the compressor.
[ON] The AC fan motor turns ON 5 seconds before the compressor starts up.
[OFF] The AC fan motor turns OFF 15 seconds after the compressor has stopped running.



9-2. R.V. coil control

Heating ..... ON
Cooling..... OFF
Dry..... OFF

NOTE: The 4-way valve reverses for 5 seconds right before start-up of the compressor.



9-3. Relation between main sensor and actuator

Sensor	Purpose	Actuator					
		Compressor	LEV	Outdoor fan motor	R.V.coil	Indoor fan motor	Defrost heater
Discharge temperature thermistor	Protection	○	○				
Indoor coil temperature thermistor	Cooling : Coil frost prevention	○					
	Heating : High pressure protection	○	○				
Defrost thermistor	Cooling : High pressure protection	○	○				
	Heating : Defrosting	○	○	○	○	○	
Fin temperature thermistor	Protection	○		○			
Ambient temperature thermistor	Cooling : Low ambient temperature operation	○	○	○			
	Heating : Defrosting (Heater)						○

10 SERVICE FUNCTIONS

MUZ-A09YV -E1 MUZ-A12YV -E1
MUZ-A09YVH -E1 MUZ-A12YVH -E1

CHANGE IN DEFROST SETTING

<JS> When the JS wire of the outdoor Inverter P.C. board is cut/ soldered, the defrost finish temperature is changed.
(Refer to page 32.)

Jumper wire		Defrost finish temperature (Initial setting)	Model
JS	none (cut)	8℃	**MUZ-A09YVH - E1 (Serial number 4000531~)** **MUZ-A12YVH - E1 (Serial number 4000211~)**
	soldered	5℃	**MUZ-A09YV - E1** **MUZ-A12YV - E1** **MUZ-A09YVH - E1 (Serial number ~4000530)** **MUZ-A12YVH - E1 (Serial number ~4000210)**

11 TROUBLESHOOTING

MUZ-A09YV -E1 MUZ-A12YV -E1
MUZ-A09YVH -E1 MUZ-A12YVH -E1

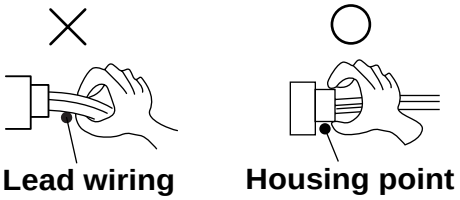
11-1. Cautions on troubleshooting

1. Before troubleshooting, check the following:

1) Check the power supply voltage.
2) Check the indoor/outdoor connecting wire for mis-wiring.

2. Take care the following during servicing.

1) Before servicing the air conditioner, be sure to first turn off the remote controller to stop the main unit, and then after confirming the horizontal vane is closed, turn off the breaker and / or disconnect the power plug.
2) Be sure to turn OFF the power supply before removing the front panel, the cabinet, the top panel, and the electronic control P.C. board.
3) When removing the electrical parts, be careful to the residual voltage of smoothing capacitor.
4) When removing the electronic control P.C. board, hold the edge of the board with care NOT to apply stress on the components.
5) When connecting or disconnecting the connectors, hold the housing of the connector. DO NOT pull the lead wires.



3. Troubleshooting procedure

1) First, check if the OPERATION INDICATOR lamp on the indoor unit is flashing on and off to indicate an abnormality. To make sure, check how many times the abnormality indication is flashing on and off before starting service work.
2) Before servicing check that the connector and terminal are connected properly.
3) If the electronic control P.C. board is supposed to be defective, check the copper foil pattern for disconnection and the components for bursting and discoloration.
4) When troubleshooting, refer to the flow chart on page 23 and check table on page 24.

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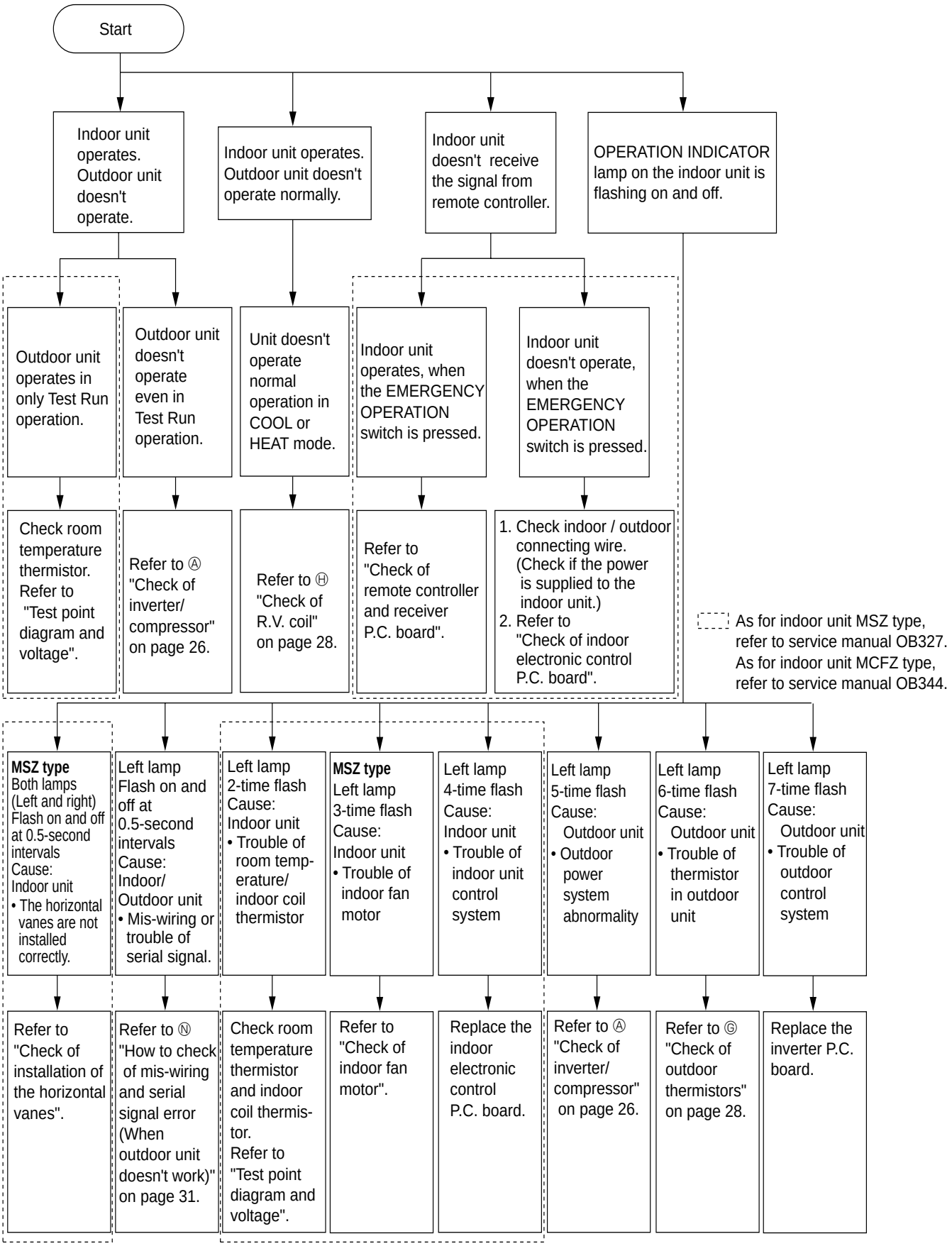
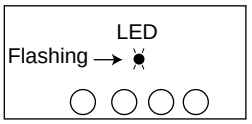
11-2. Instruction of troubleshooting


Start
Indoor unit operates. Outdoor unit doesn't operate.
Indoor unit operates. Outdoor unit doesn't operate normally.
Indoor unit doesn't receive the signal from remote controller.
OPERATION INDICATOR lamp on the indoor unit is flashing on and off.
Outdoor unit operates in only Test Run operation.
Outdoor unit doesn't operate even in Test Run operation.
Unit doesn't operate normal operation in COOL or HEAT mode.
Indoor unit operates, when the EMERGENCY OPERATION switch is pressed.
Indoor unit doesn't operate, when the EMERGENCY OPERATION switch is pressed.
Check room temperature thermistor. Refer to "Test point diagram and voltage".
Refer to Ⓐ "Check of inverter/ compressor" on page 26.
Refer to Ⓗ "Check of R.V. coil" on page 28.
Refer to "Check of remote controller and receiver P.C. board".
1. Check indoor / outdoor connecting wire. (Check if the power is supplied to the indoor unit.)
2. Refer to "Check of indoor electronic control P.C. board".
As for indoor unit MSZ type, refer to service manual OB327.
As for indoor unit MCFZ type, refer to service manual OB344.
MSZ type Both lamps (Left and right) Flash on and off at 0.5-second intervals Cause: Indoor unit • The horizontal vanes are not installed correctly.
Left lamp Flash on and off at 0.5-second intervals Cause: Indoor/ Outdoor unit • Mis-wiring or trouble of serial signal.
Left lamp 2-time flash Cause: Indoor unit • Trouble of room temperature/ indoor coil thermistor
MSZ type Left lamp 3-time flash Cause: Indoor unit • Trouble of indoor fan motor
Left lamp 4-time flash Cause: Indoor unit • Trouble of indoor unit control system
Left lamp 5-time flash Cause: Outdoor unit • Outdoor power system abnormality
Left lamp 6-time flash Cause: Outdoor unit • Trouble of thermistor in outdoor unit
Left lamp 7-time flash Cause: Outdoor unit • Trouble of outdoor control system
Refer to "Check of installation of the horizontal vanes".
Refer to Ⓝ "How to check of mis-wiring and serial signal error (When outdoor unit doesn't work)" on page 31.
Check room temperature thermistor and indoor coil thermistor. Refer to "Test point diagram and voltage".
Refer to "Check of indoor fan motor".
Replace the indoor electronic control P.C. board.
Refer to Ⓐ "Check of inverter/ compressor" on page 26.
Refer to Ⓖ "Check of outdoor thermistors" on page 28.
Replace the inverter P.C. board.

1. Troubleshooting check table

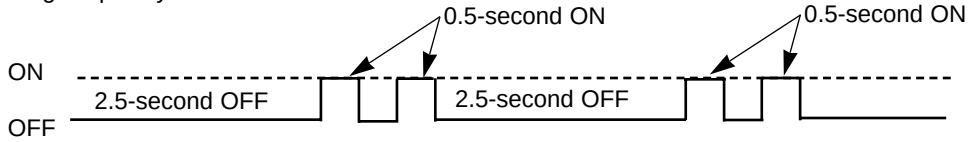
<Inverter P.C. board>



NOTE 1. The location of LED is illustrated at the right figure. Refer to page 32.
2. LED lights up during normal operation.

No.	Symptom	LED indication	Abnormal point/ Condition	Detection method	Checkpoint
1	Outdoor unit does not operate	1-time flash every 2.5 seconds NOTE: For abnormality location, refer to 'Indoor troubleshooting check table'. Refer to service manual OB327.	Outdoor power system	When compressor has stopped by overcurrent protection within 1 minute 3 times in a row after compressor start-up, unit stops.	· Check stop valve. · Reconnect connectors. · Refer to Ⓐ "How to check inverter/ compressor" on page 26.
2			Outdoor thermistors	When discharge temperature thermistor, fin temperature thermistor or defrost thermistor shorts or opens during compressor running, compressor stops and restarts 3 minutes later.	· Refer to Ⓖ "Check of outdoor thermistors" on page 28.
3			Outdoor control system	When nonvolatile memory data cannot be read properly, compressor stops and restarts 3 minutes later.	Replace inverter P.C. board after check of Ⓐ "How to check inverter/ compressor" on page 26 and Ⓖ "Check of outdoor thermistors" on page 28.
4			Bus-bar voltage	When the bus-bar voltage of inverter cannot be detected normally.	Refer to Ⓐ "How to check inverter/ compressor" on page 26.
5	'Outdoor unit stops and restarts 3 minutes later' is repeated	2-time flash 2.5 seconds OFF	Overcurrent protection	When 12A(MUZ-A09YV, MUZ-A09YVH)/ 20A(MUZ-A12YV, MUZ-A12YVH) current flows into power transistor module, compressor stops and restarts 3 minutes later.	· Check stop valve. · Reconnect connectors. · Refer to Ⓐ "How to check inverter/ compressor" on page 26.
6		3-time flash 2.5 seconds OFF	Discharge temperature overheat protection	When discharge temperature thermistor exceeds 116℃, compressor stops. Compressor can restart if discharge temperature thermistor reads 100℃ or less 3 minutes later.	· Check refrigerant circuit and refrigerant amount. · Refer to Ⓖ "Check of outdoor thermistors" on page 28. · Refer to Ⓛ "Check of LEV" on page 30.
7		4-time flash 2.5 seconds OFF	Fin temperature thermistor overheat protection	When temperature at heat sink exceeds 83℃ or temperature of inverter P.C. board exceeds 79℃, compressor stops and restarts 3 minutes later.	· Check around outdoor unit. · Check outdoor unit air passage. · Refer to Ⓘ "Check of outdoor fan motor" on page 29.
8		5-time flash 2.5 seconds OFF	High pressure protection	When indoor coil thermistor exceeds 70℃. When the defrost thermistor exceeds 70℃ in COOL mode.	· Check refrigerant circuit and refrigerant amount. · Check stop valve.
9		8-time flash 2.5 seconds OFF	Compressor sinusoidal current	When the waveform of compressor current is distorted.	· Check stop valve. · Reconnect connector. · Refer to Ⓐ "How to check inverter/ compressor" on page 26.
10	Outdoor unit operates (at low frequency)	1-time flash 2.5 seconds OFF	Frequency drop by current protection	When current from power outlet exceeds 7A(MUZ-A09YV, MUZ-A09YVH)/ 9A(MUZ-A12YV, MUZ-A12YVH), compressor frequency lowers.	The unit is normal, but check the following. · Check if indoor filters are clogged. · Check if refrigerant is short. · Check if indoor/outdoor unit air circulation is short cycled.
11		3-time flash 2.5 seconds OFF	Frequency drop by high pressure protection	When indoor coil thermistor exceeds 55℃ in HEAT mode, compressor frequency lowers.	
			Frequency drop by defrosting in COOL mode	When indoor coil thermistor reads 6℃ or less in COOL mode, compressor frequency lowers.	
12		4-time flash 2.5 seconds OFF	Frequency drop by discharge temperature protection	When discharge temperature thermistor exceeds 110℃, compressor frequency lowers.	
13	Outdoor unit operates	5-time flash 2.5 seconds OFF	Outdoor thermistors	When ambient temperature thermistor shorts or opens during compressor running.	· Refer to Ⓖ "Check of outdoor thermistors" on page 28.
14		7-time flash 2.5 seconds OFF	Low discharge temperature protection	When discharge temperature has been 40℃ or less for 20 minutes.	· Refer to Ⓛ "Check of LEV" on page 30. · Check refrigerant circuit and refrigerant amount.
15		8-time flash 2.5 seconds OFF	PAM protection PAM: Pulse Amplitude Modulation	When the overcurrent flows into IGBT(Insulated Gate Bipolar transistor : TR821) or when the bus-bar voltage reaches 300V or more, PAM stops and restarts.	This is not malfunction. PAM protection will be activated in the following cases; ①Instantaneous power voltage drop (Short time power failure) ②When the power supply voltage is high.
16		9-time flash 2.5 seconds OFF	Inverter check mode	When the connector of compressor is disconnected, inverter check mode starts.	Check if the connector is correctly connected. Refer to Ⓐ "How to check inverter/ compressor" on page 26.

The flashing frequency shows the number of times the LED blinks after every 2.5-second OFF.
(Example) When the flashing frequency is “2”.



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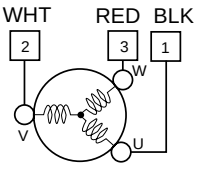
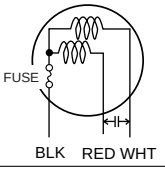
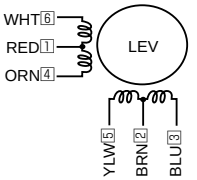
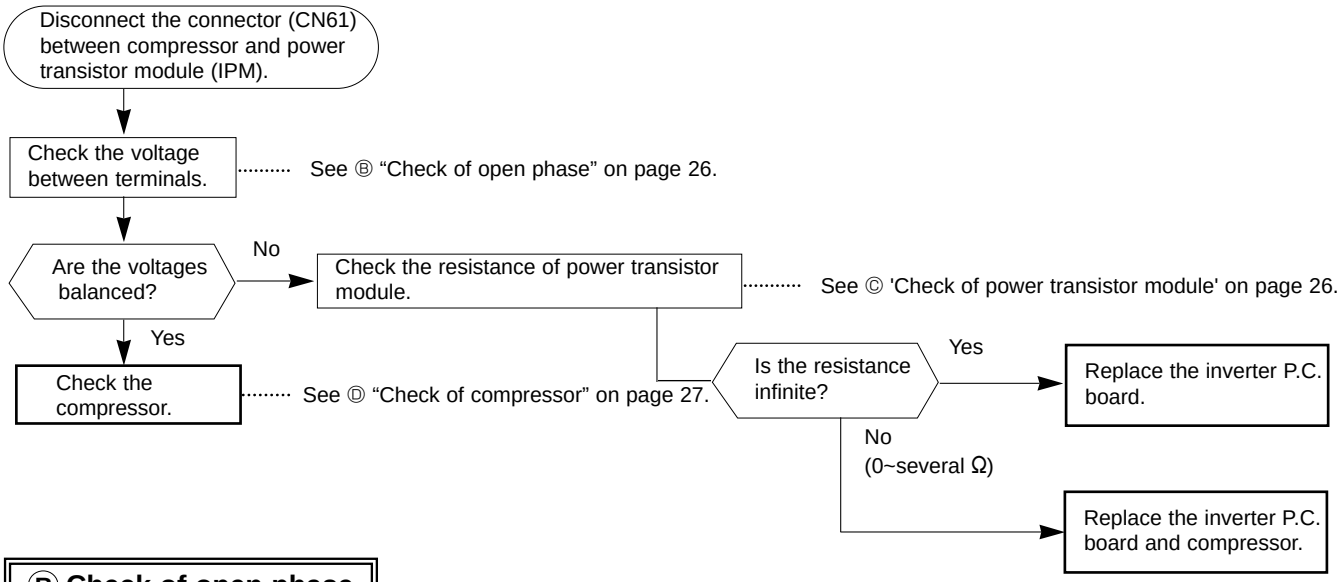
2. Trouble criterion of main parts

MUZ-A09YV -E1 MUZ-A12YV -E1
MUZ-A09YVH -E1 MUZ-A12YVH -E1

<table>
<tr><th>Part name</th><th>Check method and criterion</th><th>Figure</th></tr>
<tr><td>Defrost thermistor (RT61)
Ambient temperature thermistor(RT65)</td><td>Measure the resistance with a tester. (Part temperature –15˚C ~ 40˚C)<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>5 kΩ ~ 65 kΩ</td><td>Open or short-circuit</td></tr></table></td><td></td></tr>
<tr><td>Discharge temperature thermistor(RT62)</td><td>Measure the resistance with a tester.
Before measurement, hold the thermistor with your hands to warm it up.
(Part temperature 0˚C ~ 40˚C)<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>150 kΩ ~ 600 kΩ</td><td>Open or short-circuit</td></tr></table></td><td></td></tr>
<tr><td>Fin temperature thermistor(RT64)</td><td>Measure the resistance with a tester.
Before measurement, hold the thermistor with your hands to warm it up.
(Part temperature 0˚C ~ 40˚C)<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>30 kΩ ~ 180 kΩ</td><td>Open or short-circuit</td></tr></table></td><td></td></tr>
<tr><td>Compressor(MC)</td><td>Measure the resistance between the terminals with a tester.
(Part temperature –15˚C ~ 40˚C)<table><tr><th></th><th colspan="2">Normal</th><th rowspan="2">Abnormal</th></tr><tr><th></th><th>MUZ-A09YV
MUZ-A09YVH</th><th>MUZ-A12YV
MUZ-A12YVH</th></tr><tr><td>U-V
U-W
V-W</td><td>1.31 Ω ~ 1.66Ω</td><td>0.42 Ω ~ 0.53 Ω</td><td>Open or short-circuit</td></tr></table></td><td> 
</td></tr>
<tr><td>Outdoor fan motor(MF)
INNER FUSE
152± 0/5 ℃ CUT OFF</td><td>Measure the resistance between the terminals with a tester.
(Part temperature –15˚C ~ 40˚C)<table><tr><th>Color of lead wire</th><th>Normal</th><th>Abnormal</th></tr><tr><td>WHT – BLK</td><td>299 Ω ~ 374 Ω</td><td rowspan="2">Open or short-circuit</td></tr><tr><td>BLK – RED</td><td>242 Ω ~ 304 Ω</td></tr></table></td><td> 
</td></tr>
<tr><td>R.V. coil(21S4)</td><td>Measure the resistance between the terminals with a tester.
(Part temperature –15˚C ~ 40˚C)<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>1.90 kΩ ~ 2.39 kΩ</td><td>Open or short-circuit</td></tr></table></td><td></td></tr>
<tr><td>LEV(Expansion valve)</td><td>Measure the resistance with a tester.
(Part temperature : –15˚C ~ 40˚C)<table><tr><th>Color of lead wire</th><th>Normal</th><th>Abnormal</th></tr><tr><td>WHT – RED</td><td rowspan="4">39 Ω ~ 50 Ω</td><td rowspan="4">Open or short-circuit</td></tr><tr><td>RED – ORN</td></tr><tr><td>YLW – BRN</td></tr><tr><td>BRN – BLU</td></tr></table></td><td> 
</td></tr>
<tr><td>Defrost heater(H)</td><td>Measure the resistance with a tester.
(Part temperature -15˚C ~ 40˚C)<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>341 Ω ~ 427 Ω</td><td>Open or short-circuit</td></tr></table></td><td></td></tr>
</table>

When OPERATION INDICATOR lamp flashes 5-time.
Outdoor unit does not operate.

Ⓐ How to check inverter/ compressor


Disconnect the connector (CN61) between compressor and power transistor module (IPM).
Check the voltage between terminals.
See Ⓑ "Check of open phase" on page 26.
Are the voltages balanced?
No
Check the resistance of power transistor module.
See Ⓒ 'Check of power transistor module' on page 26.
Yes
Check the compressor.
See Ⓓ "Check of compressor" on page 27.
Is the resistance infinite?
Yes
Replace the inverter P.C. board.
No
(0~several Ω)
Replace the inverter P.C. board and compressor.

Ⓑ Check of open phase

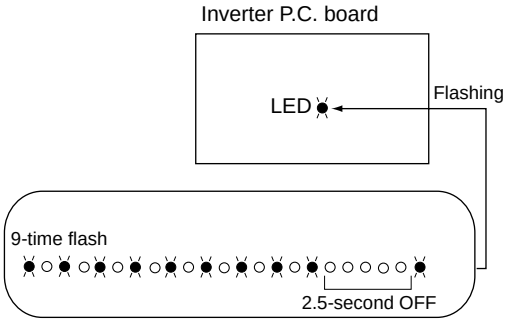
●With the connector between compressor and power transistor module disconnected, activate the inverter and check if the inverter is normal by measuring the balance of voltage between terminals.

Output voltage [V]
115V

<< Operation method>>
Start cooling or heating operation by pressing the EMERGENCY OPERATION switch on the indoor unit. (test-run mode : refer to page 14)
<<Measurement point>>
at 3 points
BLK (U)-WHT (V)
BLK (U)-RED (W)
WHT(V)-RED (W)

※ Measure AC voltage between the lead wires at 3 points.

NOTE 1. Output voltage varies according to power supply voltage.
2. Measure the voltage by analog type tester.
3. During this check, LED of inverter P.C. board flashes 9 times.

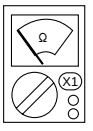


Ⓒ Check of power transistor module

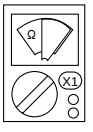
●Disconnect the connector (CN61) between compressor and power transistor module, and measure the resistance between terminals on the power transistor module.
<<Measurement point>>
at 6 points
BLK-WHT, WHT-BLK
BLK-RED, RED-BLK
WHT-RED, RED-WHT

<<Judgement>>
Infinite [Ω]……Normal
0~dozens of ……Abnormal (short)

ohmmeter indication



…… Normal (infinite)



…… Abnormal (0~dozens of Ω)

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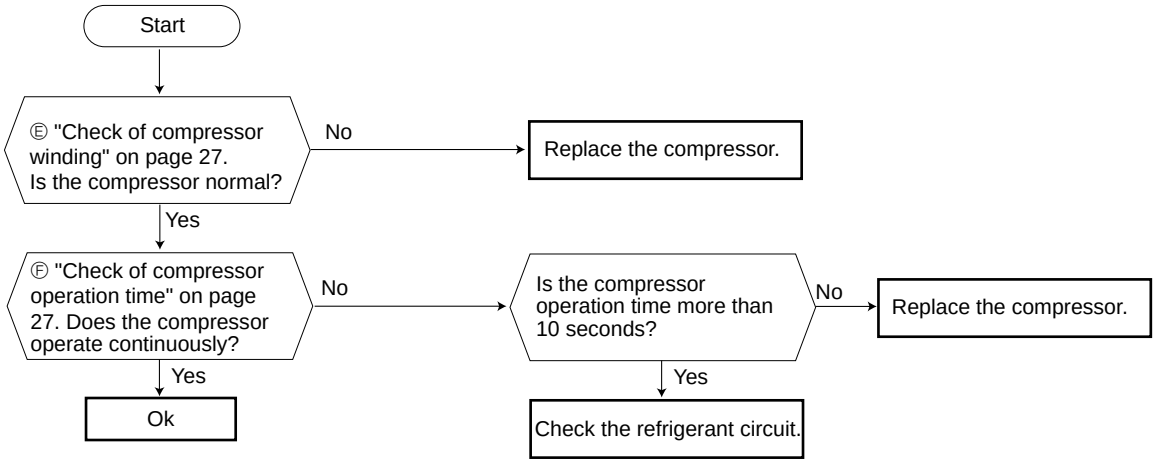
Ⓓ Check of compressor



Ⓔ Check of compressor winding

● Disconnect the connector (CN61) between compressor and power transistor module, and measure the resistance between the compressor terminals.

<<Measurement point>>

at 3 points

BLK-WHT

BLK-RED

WHT-RED

※ Measure the resistance between the lead wires at 3 points.

<<Judgement>>

Refer to page 25.

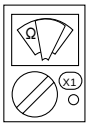
0[Ω] ……Abnormal [short]

Infinite[Ω] ……Abnormal [open]

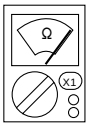
NOTE 1. Be sure to zero the ohmmeter before measurement.

2. Winding resistance for each phase at 20℃.
Refer to page 5.

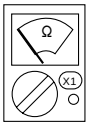
Ohmmeter indication



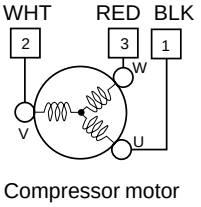
…… Normal
(1~several Ω)



…… Abnormal
(0Ω …… short)



…… Abnormal
(infinite…… open)



Compressor motor

Ⓕ Check of compressor operation time

●Connect the compressor and activate the inverter. Then measure the time until the inverter stops due to over current.

<<Operation method>>

Start heating or cooling operation by pressing the EMERGENCY OPERATION switch on the indoor unit. (Test-run mode)

<<Measurement>>

Measure the time from the start of outdoor fan running to the stop of compressor due to over current.

<<Judgement>>

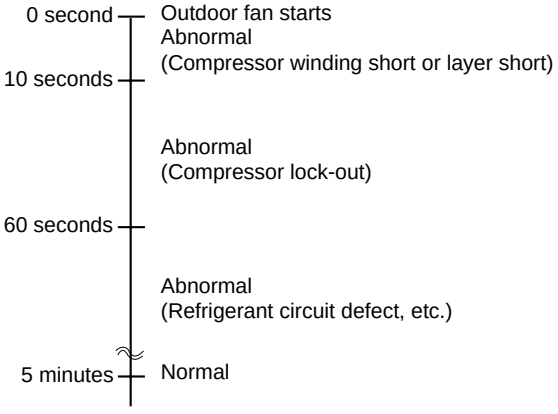
For reference

0~10 seconds……Abnormal (compressor short)

10~60 seconds……Abnormal (compressor lock-out)

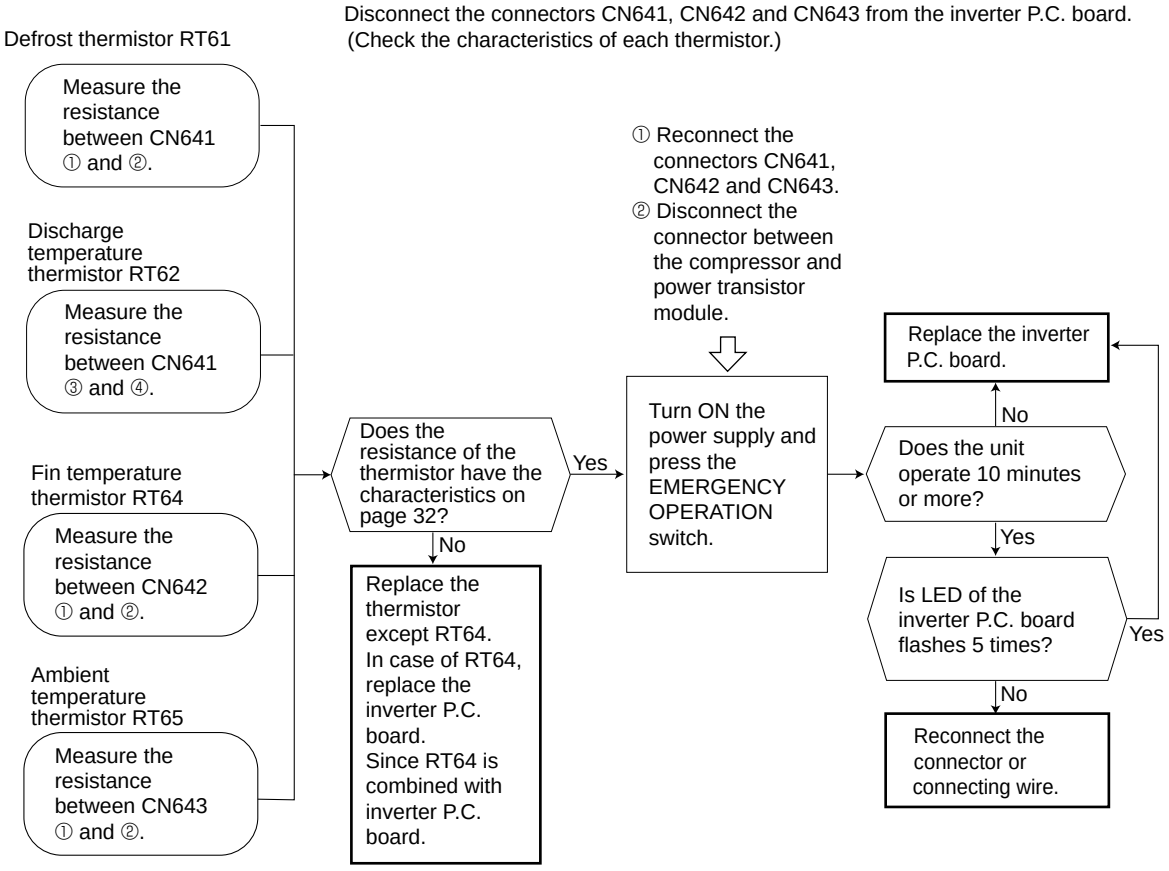
60 seconds~5 minutes……Abnormal (refrigerant circuit defect)

more than 5 minutes……Normal



When OPERATION INDICATOR lamp flashes 6-time.
The thermistors in the outdoor unit are abnormal.

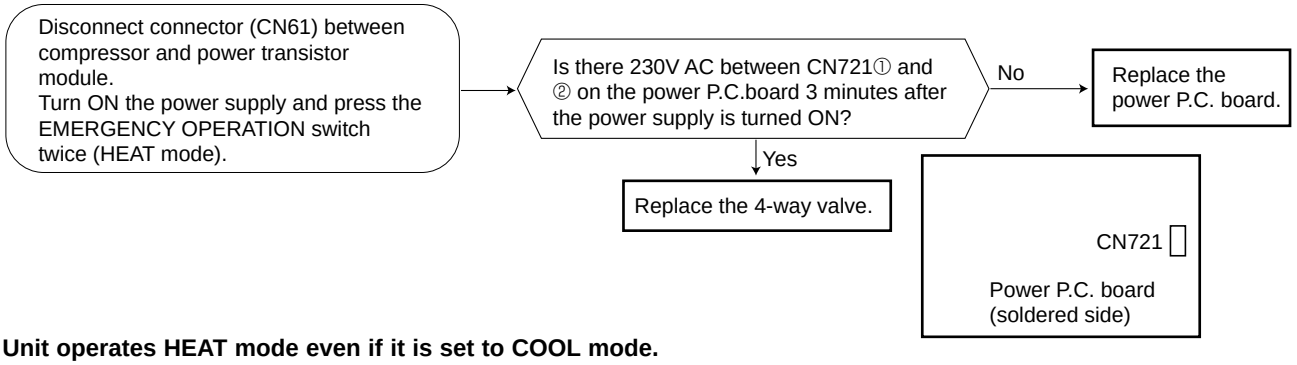
Ⓖ Check of outdoor thermistors


Disconnect the connectors CN641, CN642 and CN643 from the inverter P.C. board.
(Check the characteristics of each thermistor.)
Defrost thermistor RT61
Measure the resistance between CN641 ① and ②.
Discharge temperature thermistor RT62
Measure the resistance between CN641 ③ and ④.
Fin temperature thermistor RT64
Measure the resistance between CN642 ① and ②.
Ambient temperature thermistor RT65
Measure the resistance between CN643 ① and ②.
Does the resistance of the thermistor have the characteristics on page 32?
Yes
No
Replace the thermistor except RT64. In case of RT64, replace the inverter P.C. board. Since RT64 is combined with inverter P.C. board.
① Reconnect the connectors CN641, CN642 and CN643.
② Disconnect the connector between the compressor and power transistor module.
Turn ON the power supply and press the EMERGENCY OPERATION switch.
Does the unit operate 10 minutes or more?
No
Yes
Replace the inverter P.C. board.
Is LED of the inverter P.C. board flashes 5 times?
Yes
No
Reconnect the connector or connecting wire.

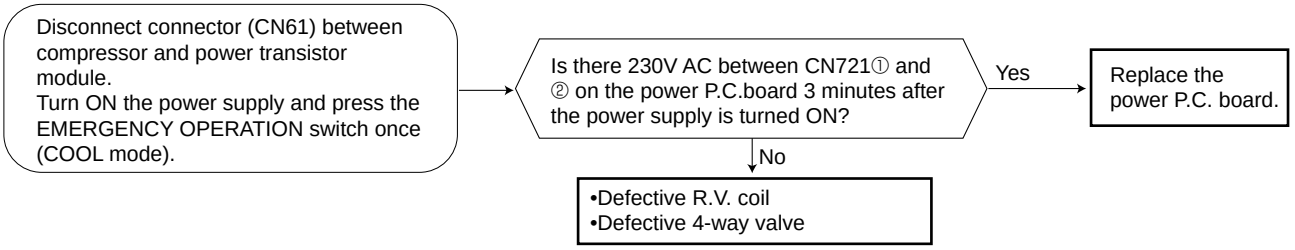
Ⓗ Check of R.V. coil

※ First of all, measure the resistance of R.V. coil to check if the coil is defective (refer to page 25).
※ In case CN721 is not connected or R.V. coil is open, voltage is generated between the terminal pins of the connector although any signal is not being transmitted to R.V. coil. Check if CN721 is connected.

Unit operates COOL mode even if it is set to HEAT mode.


Disconnect connector (CN61) between compressor and power transistor module.
Turn ON the power supply and press the EMERGENCY OPERATION switch twice (HEAT mode).
Is there 230V AC between CN721① and ② on the power P.C.board 3 minutes after the power supply is turned ON?
No
Replace the power P.C. board.
Yes
Replace the 4-way valve.
CN721
Power P.C. board (soldered side)

Unit operates HEAT mode even if it is set to COOL mode.


Disconnect connector (CN61) between compressor and power transistor module.
Turn ON the power supply and press the EMERGENCY OPERATION switch once (COOL mode).
Is there 230V AC between CN721① and ② on the power P.C.board 3 minutes after the power supply is turned ON?
Yes
Replace the power P.C. board.
No
•Defective R.V. coil
•Defective 4-way valve

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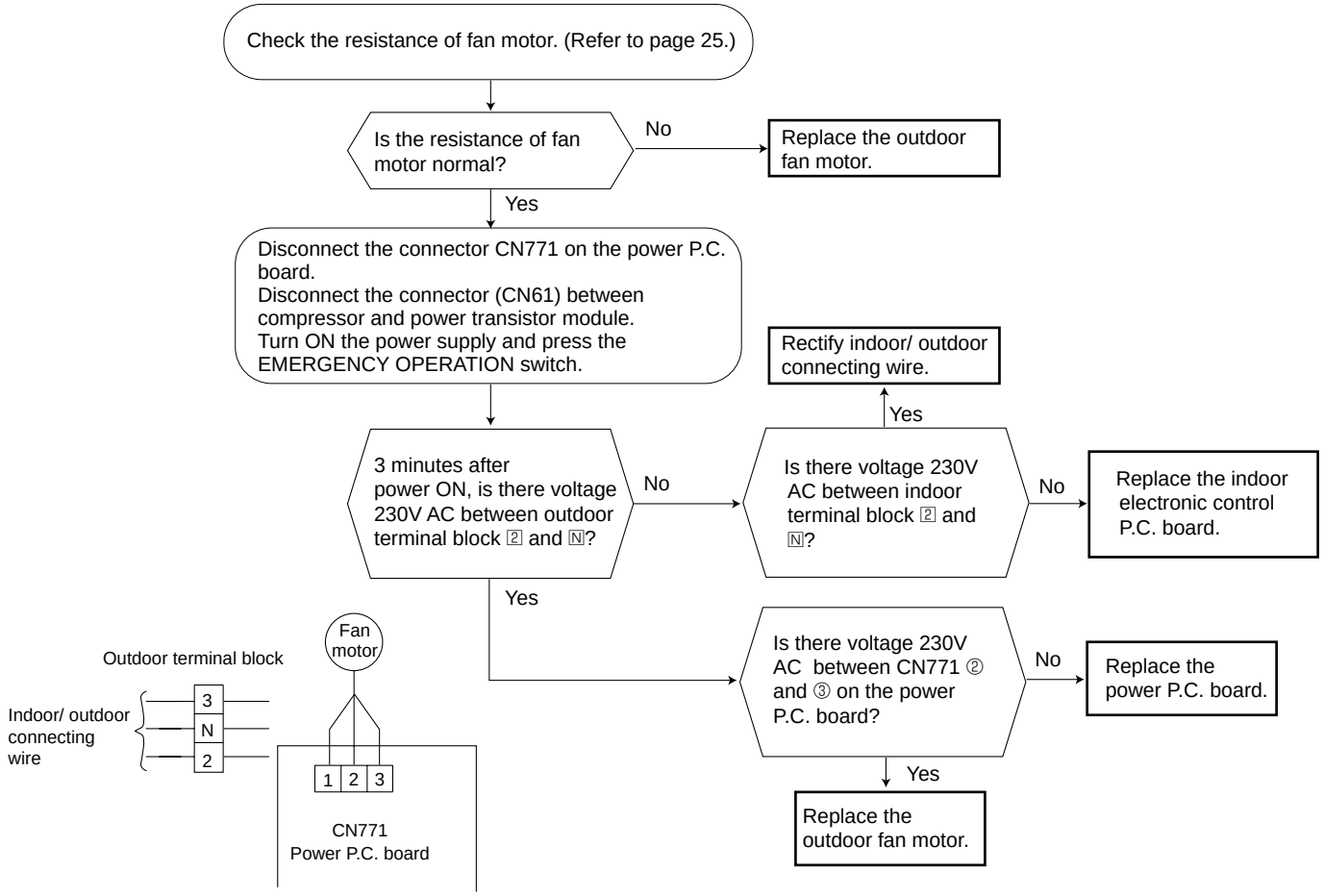
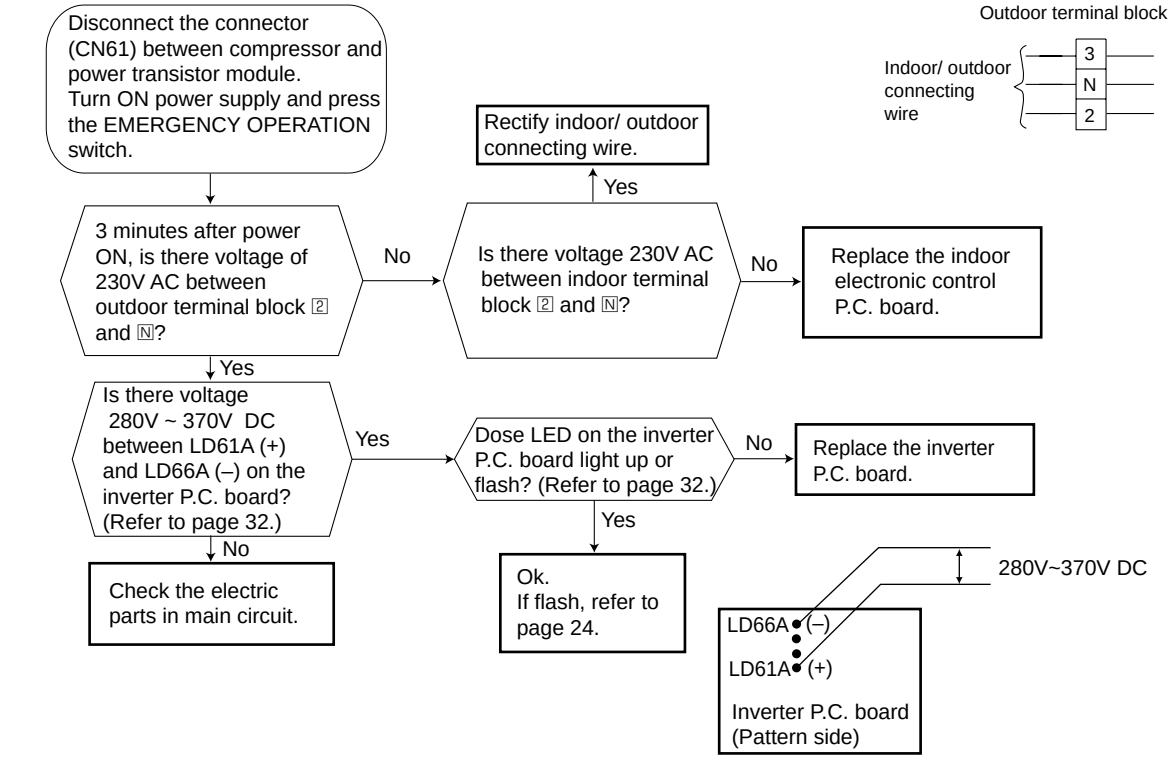
Outdoor fan motor does not operate.

Ⓘ Check of outdoor fan motor


Check the resistance of fan motor. (Refer to page 25.)
Is the resistance of fan motor normal?
No
Replace the outdoor fan motor.
Yes
Disconnect the connector CN771 on the power P.C. board.
Disconnect the connector (CN61) between compressor and power transistor module.
Turn ON the power supply and press the EMERGENCY OPERATION switch.
Rectify indoor/ outdoor connecting wire.
Yes
3 minutes after power ON, is there voltage 230V AC between outdoor terminal block 2 and N?
No
Is there voltage 230V AC between indoor terminal block 2 and N?
No
Replace the indoor electronic control P.C. board.
Yes
Is there voltage 230V AC between CN771 ② and ③ on the power P.C. board?
No
Replace the power P.C. board.
Yes
Replace the outdoor fan motor.
Outdoor terminal block
Indoor/ outdoor connecting wire
3
N
2
Fan motor
1 2 3
CN771
Power P.C. board

Inverter does not operate.

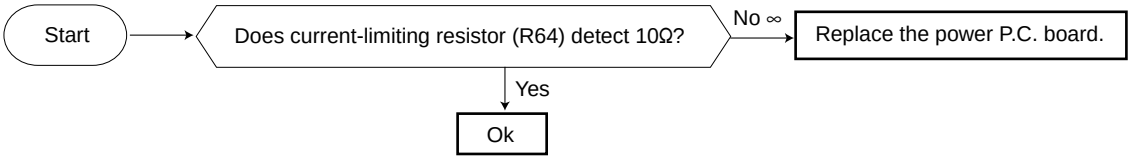
Ⓙ Check of power supply


Disconnect the connector (CN61) between compressor and power transistor module.
Turn ON power supply and press the EMERGENCY OPERATION switch.
Outdoor terminal block
Indoor/ outdoor connecting wire
3
N
2
Rectify indoor/ outdoor connecting wire.
Yes
3 minutes after power ON, is there voltage of 230V AC between outdoor terminal block 2 and N?
No
Is there voltage 230V AC between indoor terminal block 2 and N?
No
Replace the indoor electronic control P.C. board.
Yes
Is there voltage 280V ~ 370V DC between LD61A (+) and LD66A (–) on the inverter P.C. board? (Refer to page 32.)
Yes
Dose LED on the inverter P.C. board light up or flash? (Refer to page 32.)
No
Replace the inverter P.C. board.
No
Check the electric parts in main circuit.
Yes
Ok.
If flash, refer to page 24.
280V~370V DC
LD66A (–)
LD61A (+)
Inverter P.C. board
(Pattern side)

Outdoor unit does not operate at all or stops immediately due to over current.

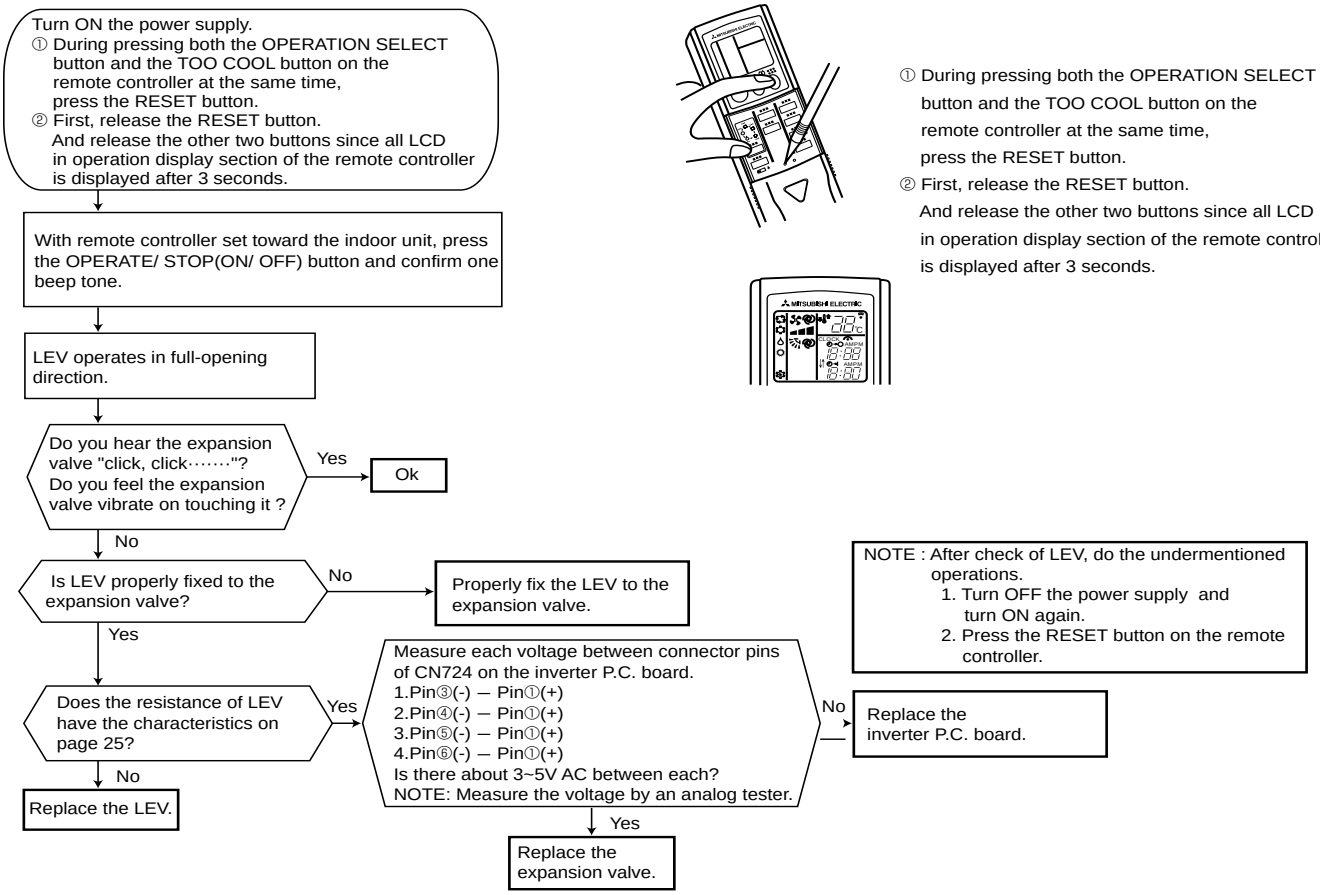
Ⓚ Check of current-limiting resistor

When the current-limiting resistor is open, the rush current limiting relay (X64) may not work properly.



Heating/Cooling does not work sufficiently.

Ⓛ Check of LEV (Expansion valve)

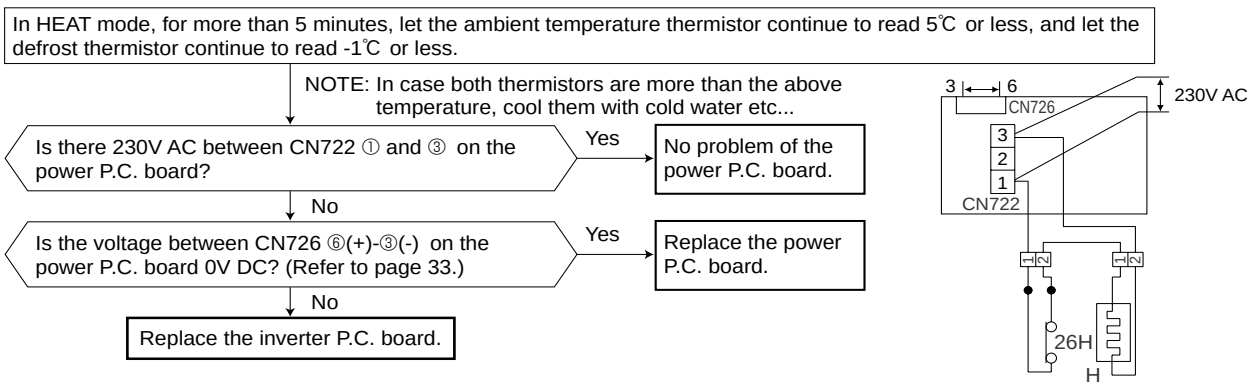

Turn ON the power supply.
① During pressing both the OPERATION SELECT button and the TOO COOL button on the remote controller at the same time, press the RESET button.
② First, release the RESET button.
And release the other two buttons since all LCD in operation display section of the remote controller is displayed after 3 seconds.
With remote controller set toward the indoor unit, press the OPERATE/ STOP(ON/ OFF) button and confirm one beep tone.
LEV operates in full-opening direction.
Do you hear the expansion valve "click, click·····"? Do you feel the expansion valve vibrate on touching it ?
Yes
Ok
No
Is LEV properly fixed to the expansion valve?
No
Properly fix the LEV to the expansion valve.
Yes
Does the resistance of LEV have the characteristics on page 25?
Yes
No
Replace the LEV.
Measure each voltage between connector pins of CN724 on the inverter P.C. board.
1.Pin③(-) — Pin①(+)
2.Pin④(-) — Pin①(+)
3.Pin⑤(-) — Pin①(+)
4.Pin⑥(-) — Pin①(+)
Is there about 3~5V AC between each?
NOTE: Measure the voltage by an analog tester.
No
Replace the inverter P.C. board.
Yes
Replace the expansion valve.
① During pressing both the OPERATION SELECT button and the TOO COOL button on the remote controller at the same time, press the RESET button.
② First, release the RESET button.
And release the other two buttons since all LCD in operation display section of the remote controller is displayed after 3 seconds.
NOTE : After check of LEV, do the undermentioned operations.
1. Turn OFF the power supply and turn ON again.
2. Press the RESET button on the remote controller.

Outdoor base gets frozen.

Ⓜ Check of defrost heater

<MUZ-A09YVH MUZ-A12YVH>

Check the following points before checking electric continuity.
1) Does the resistance of ambient temperature thermistor have the characteristics? (Refer to page 32.)
2) Is the resistance of defrost heater normal? (Refer to page 25.)
3) Does the heater protector remain conducted (not open)?
4) Are both ambient temperature thermistor and circuit of defrost heater securely connected to connectors?


In HEAT mode, for more than 5 minutes, let the ambient temperature thermistor continue to read 5℃ or less, and let the defrost thermistor continue to read -1℃ or less.
NOTE: In case both thermistors are more than the above temperature, cool them with cold water etc...
Is there 230V AC between CN722 ① and ③ on the power P.C. board?
Yes
No problem of the power P.C. board.
No
Is the voltage between CN726 ⑥(+)-③(-) on the power P.C. board 0V DC? (Refer to page 33.)
Yes
Replace the power P.C. board.
No
Replace the inverter P.C. board.
3
6
CN726
230V AC
3
2
1
CN722
26H
H

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When OPERATION INDICATOR lamp flashes ON and OFF in every 0.5-second.
Outdoor unit doesn't operate.

Ⓝ How to check mis-wiring and serial signal error (when outdoor unit does not work)

Start

• Turn ON the power supply.
• Press once EMERGENCY OPERATION switch.

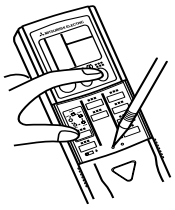
After 3 minutes, mis-wiring is indicated (0.5-second ON, 0.5-second OFF) on OPERATION INDICATOR lamp on indoor unit.※

Is there any mis-wiring, poor contact, or wire disconnection? ※2

Yes → Make them sure.

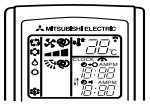
No

A



B

Turn OFF the power supply.
Disconnect the indoor/ outdoor connecting wire.
Short-circuit indoor terminal block Ⓝ and ③.
Turn ON the power supply.
During pressing both the OPERATION SELECT button and TOO COOL button on the remote controller at the same time, press the RESET button.
At first, release the RESET button.
And release the other two buttons since all LCD in operation display section of the remote controller is displayed after 3 seconds.
Transmit the signal of remote controller, pressing OPERATE/STOP (ON/OFF) button on the remote controller.
(The above procedure allows OPERATION INDICATOR lamp to indicate the failure-mode.)



•The following indication applies regardless of shape of the indicator.

Blinking

Operation Indicator □ ☼

Does the right side of OPERATION INDICATOR lamp blink quickly?

No (light up or OFF) → Replace the indoor electronic control P.C. board.

Yes

Release the failure mode. ※3

Remove the short-circuit between indoor terminal block Ⓝ and ③.
Reconnect the indoor/ outdoor connecting wire.
Turn ON the power supply.
Press the EMERGENCY OPERATION switch.
Is there amplitude of 5 to 10V DC between outdoor terminal block Ⓝ and ③ after 3 minutes (for confirmation of serial signal)?

No → Replace the indoor/ outdoor connecting wire.

Yes

Is there 230V AC between outdoor terminal block ② and Ⓝ?

No → Replace the indoor/ outdoor connecting wire.

Yes

1. Turn OFF the power supply.
2. Disconnect the connector (CN61) between the compressor and the power transistor module.
3. Turn ON the power supply.
4. Press the EMERGENCY OPERATION switch.

Is there voltage approximate 280V DC between LD61A (+) and LD66A (–) on the inverter P.C. board arter 3 minutes?

Yes → ※4 Replace the inverter P.C. board.

No

Turn OFF the power supply and then turn ON again.
Press EMERGENCY OPERATION switch.
After 3 minutes, is there approximate 230V AC between outdoor terminal block ② and Ⓝ?

Yes → ※4 Replace the inverter P.C. board.

No

Replace the indoor/ outdoor connecting wire.

※4 Be careful to the residual voltage of smoothing capacitor.

As for indoor unit MSZ type, refer to service manual OB327.
As for indoor unit MCFZ type, refer to service manual OB344.

※ Short circuit of JPG and JPS on the indoor electronic control P.C. board enables self-check to be displayed in 3 seconds.

※2 Mis-wiring may damage indoor electronic control P.C. board during the operation. Be sure to confirm the wiring is correct before the operation starts.

※3 Be sure to release the failure-mode recall function after checking.
Procedure of release of failure-mode.
① Press the EMERGENCY OPERATION switch.
② Turn OFF the power supply.
③ Press the RESET button on the remote controller.

A

· Turn OFF inverter-controlled lighting equipment.
· Turn OFF the power supply and then turn ON again.
· Press the EMERGENCY OPERATION switch.

Is mis-wiring indicated when the contactor (52C) on the indoor electronic control P.C. board turns ON 3 minutes later?

No → · Reinstall either the unit or the light each other away.
· Attach a filter on receiving section of the indoor unit.

Yes

B

MUZ-A09YV -E1 **MUZ-A12YV -E1**
MUZ-A09YVH -E1 **MUZ-A12YVH -E1**

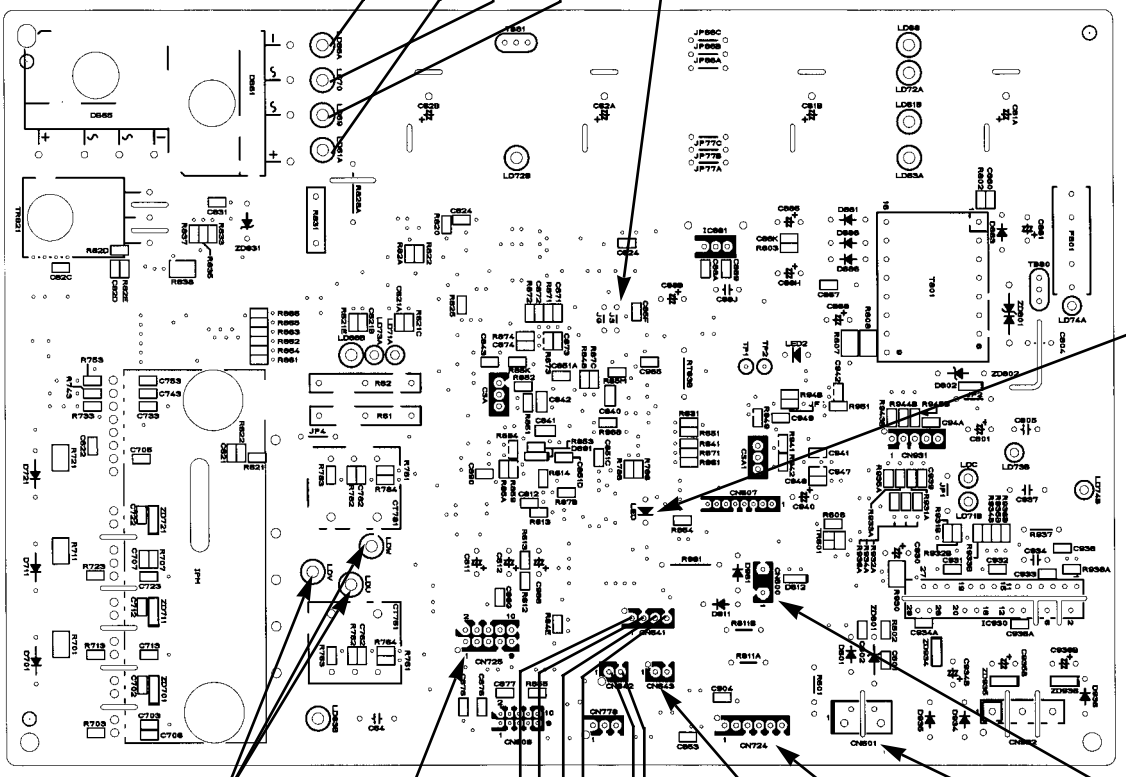
Inverter P.C. board

(Refer to page 29.)

LD66A LD61A
280V ~ 370V DC 230V AC

Jumper wire for change in defrost setting (JS)
(Refer to page 22.)

Back side of unit



LED monitor lamp

Output to drive compressor (LDU,LDV,LDW)

Connecting wire with power P.C. board (CN725)

Defrost thermistor (RT61)

Discharge temperature thermistor (RT62) (CN641)

Fin temperature thermistor (RT64) (CN642)

Ambient temperature thermistor (RT65) (CN643)

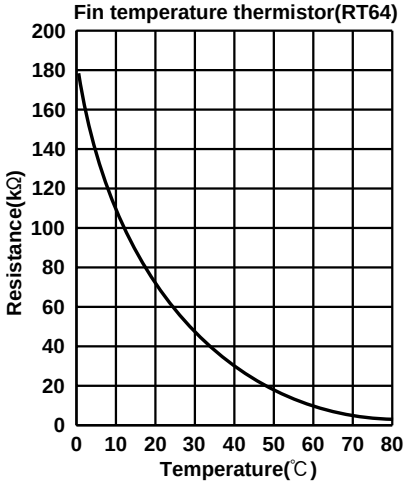
LEV connector (CN724)

Connector for indoor/ outdoor communi-cation (CN601)

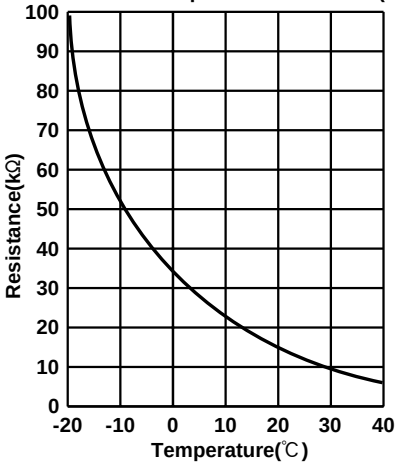
Zero cross signal connector (CN800)

Front side of unit

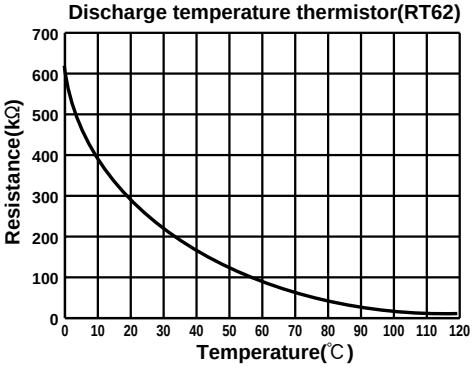
Fin temperature thermistor(RT64)



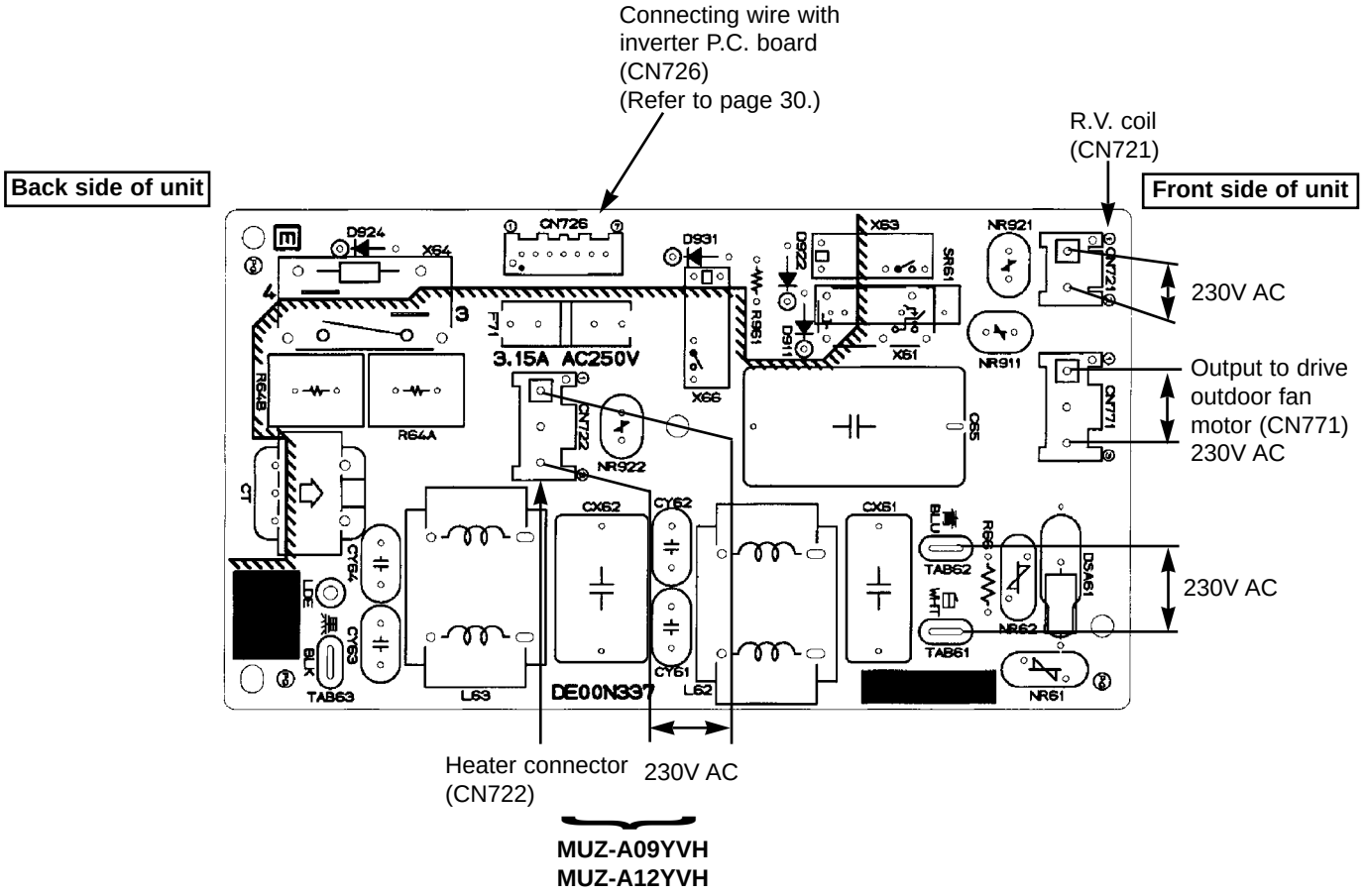
Defrost thermistor(RT61)
Ambient temperature thermistor(RT65)



Discharge temperature thermistor(RT62)



MUZ-A09YV -E1 **MUZ-A12YV -E1**
MUZ-A09YVH -E1 **MUZ-A12YVH -E1**
Power P.C. board

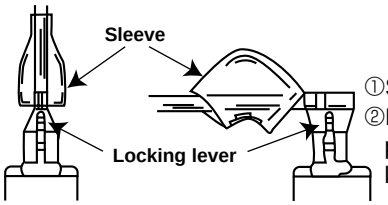


12 DISASSEMBLY INSTRUCTIONS

<"Terminal with lock mechanism" Detaching points>

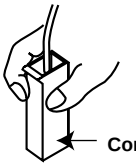
In case of terminal with lock mechanism, detach the terminal as shown below.
There are two types (Refer to (1) and (2)) of the terminal with lock mechanism.
The terminal with no lock mechanism can be removed by pulling it out.
Check the shape of the terminal and work.

(1) Slide the sleeve and check if there is a locking lever or not.



①Slide the sleeve.
②Pull the terminal while pushing the locking lever.

(2) The terminal with this connector is a terminal with lock mechanism

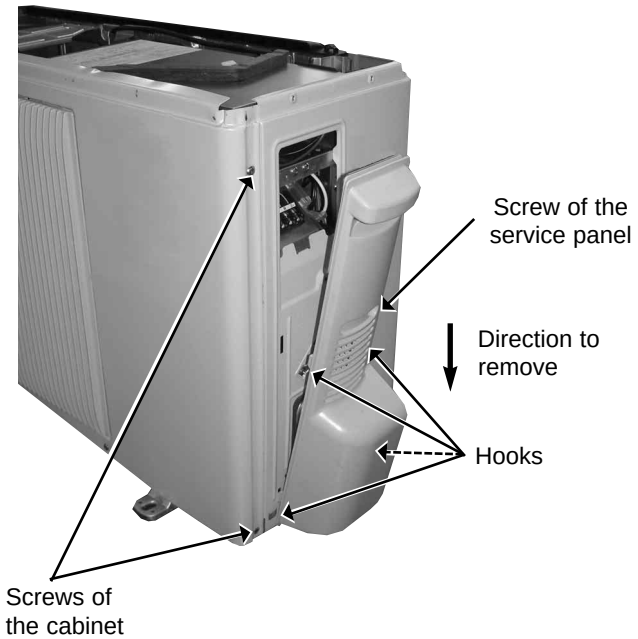


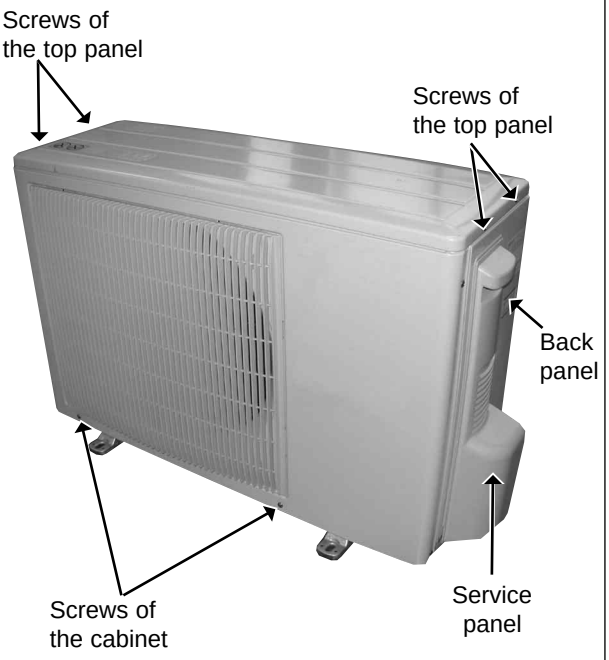
①Hold the sleeve, and pull out the terminal slowly.

MUZ-A09YV -E1 MUZ-A12YV -E1
MUZ-A09YVH -E1 MUZ-A12YVH -E1
OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet. (1) Remove the screws fixing the top panel. (Photo 1) (2) Remove the top panel. (Photo 1) (3) Remove the screw fixing the service panel. (Photo 2) (4) Pull down the service panel and remove it. (Photo 2) (5) Remove the screws fixing the cabinet. (6) Remove the cabinet. (7) Disconnect the indoor/outdoor connecting wire. (8) Remove the screws fixing the back panel. (9) Remove the back panel.	**Photo 1**

Photo 2





OPERATING PROCEDURE

2. Removing the inverter assembly, inverter P.C. board and power P.C. board

(1) Remove the top panel, cabinet and service panel. (Refer to 1.)
(2) Disconnect the indoor/outdoor connecting wire and remove the back panel. (Refer to 1.)
(3) Disconnect the ground wire, the lead wire to the reactor and the following connectors;
<Power P.C. board>
CN721 (4-way valve)
CN722 (Defrost heater) MUZ-A09/A12YVH-E1
CN771 (Fan motor)
<Inverter P.C. board>
CN641 (Defrost thermistor and discharge temperature thermistor)
CN643 (Ambient temperature thermistor)
CN724 (LEV)
(4) Remove the compressor connector (CN61).
(5) Remove the screws fixing the relay panel. (Photo 3)
(6) Remove the inverter assembly. (Photo 3)
(7) Disconnect all connectors and lead wires on the inverter P.C. board. (Photo 4)
(8) Remove the inverter P.C. board from the inverter assembly.
(9) Remove the screw fixing the power P.C. board. (Photo 4)
(10) Disconnect all connectors and lead wires on the power P.C. board.
(11) Remove the power P.C. board from the inverter assembly.

3. Removing R.V. coil

(1) Remove the top panel, cabinet and service panel. (Refer to 1.)
(2) Disconnect the indoor/outdoor connecting wire and remove the back panel. (Refer to 1.)
(3) Remove the inverter assembly. (Refer to 2.)
(4) Remove the R.V. coil. (Photo 5)

PHOTOS

Photo 3

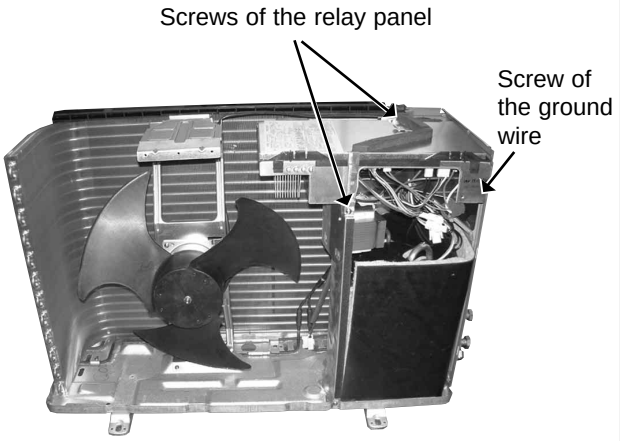
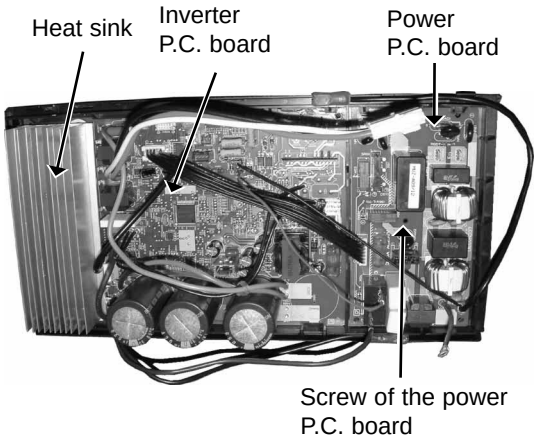
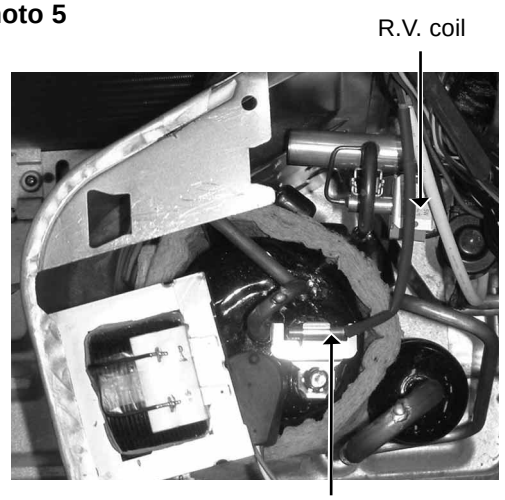
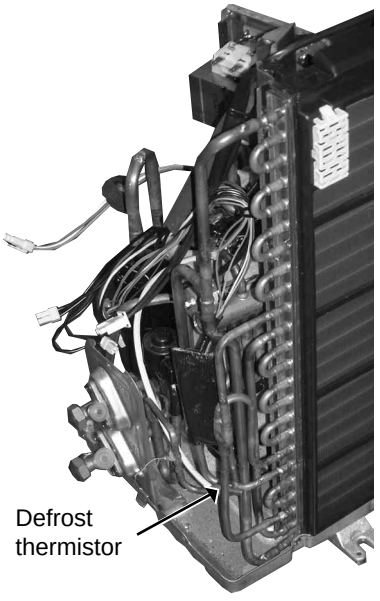


Photo 4



OPERATING PROCEDURE	PHOTOS
4. Removing the defrost thermistor and discharge temperature thermistor (1) Remove the top panel, cabinet and service panel. (Refer to 1.) (2) Disconnect the indoor/outdoor connecting wire and remove the back panel. (Refer to 1.) (3) Remove the inverter assembly. (Refer to 2.) (4) Pull out the defrost thermistor from its holder. (Photo 6) (5) Pull out the discharge temperature thermistor from its holder. (Photo 5)	**Photo 5**  **Photo 6** 

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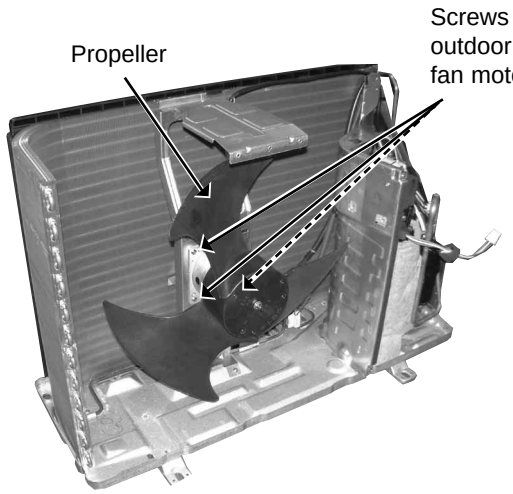
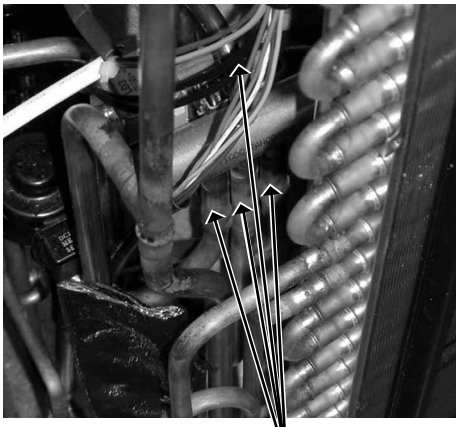
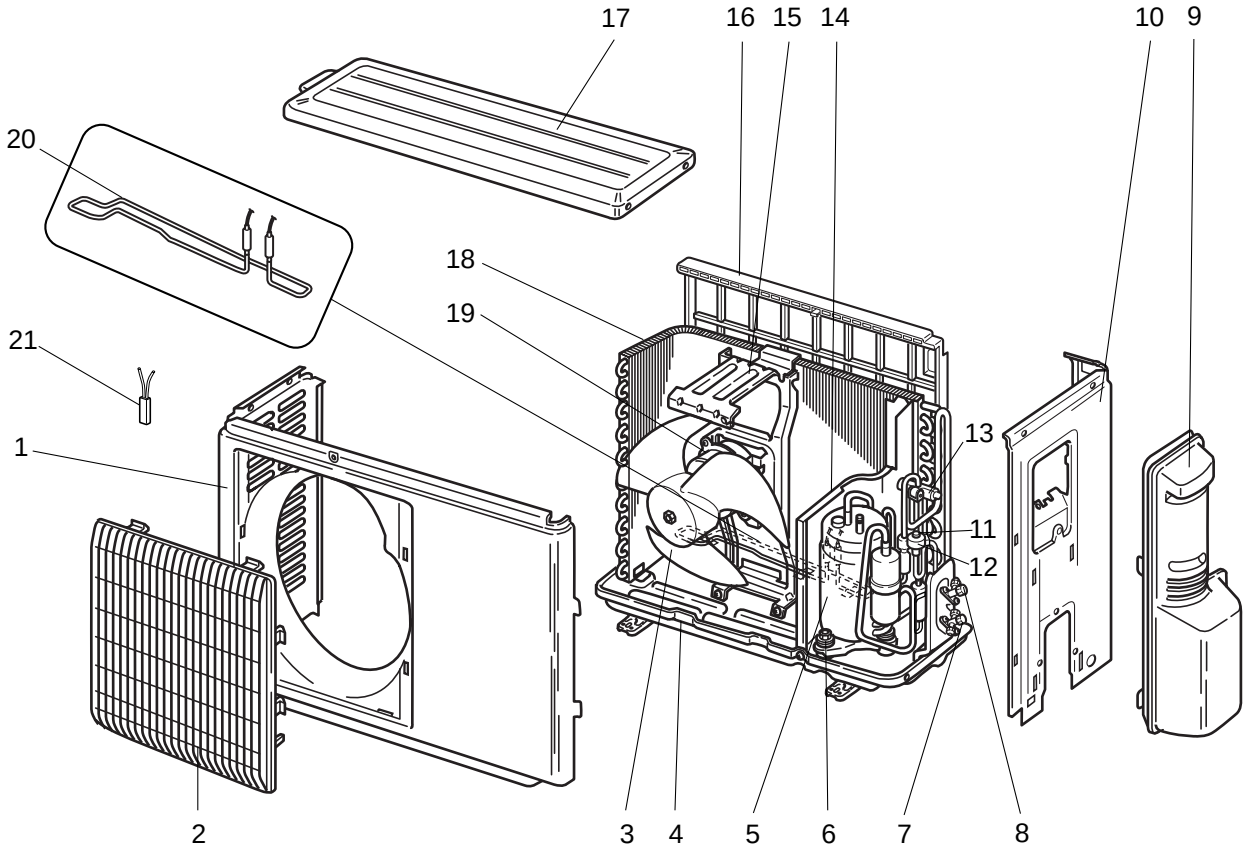
OPERATING PROCEDURE	PHOTOS
5. Removing outdoor fan motor (1) Remove the top panel, cabinet and service panel. (Refer to 1.) (2) Disconnect the indoor/outdoor connecting wire and remove the back panel. (Refer to 1.) (3) Remove the inverter assembly. (Refer to 2.) (4) Remove the propeller. (5) Remove the screws fixing the fan motor. (Photo 7) (6) Remove the fan motor. (Photo 7)	**Photo 7** 
6. Removing the compressor and 4-way valve (1) Remove the top panel, cabinet and service panel. (Refer to 1.) (2) Disconnect the indoor/outdoor connecting wire and remove the back panel. (Refer to 1.) (3) Remove the inverter assembly. (Refer to 2.) (4) Recover gas from the refrigerant circuit. (5) Detach the welded part of the suction and the discharge pipe connected with compressor. (6) Remove the nuts of compressor legs. (7) Remove the compressor. (8) Detach the welded part of pipes conneced with 4-way valve. (Photo 8) **NOTE** ● Before using a burner, reclaim gas from the pipes until the pressure gauge shows 0 kg/cm^2 (0MPa). ● Use the burner under the condition that gas can be recovered even when the inner pressure rises by heat.	**Photo 8** 

13 PARTS LIST

MUZ-A09YV -E1 MUZ-A12YV -E1
MUZ-A09YVH -E1 MUZ-A12YVH -E1

13-1. OUTDOOR UNIT STRUCTURAL PARTS AND FUNCTIONAL PARTS

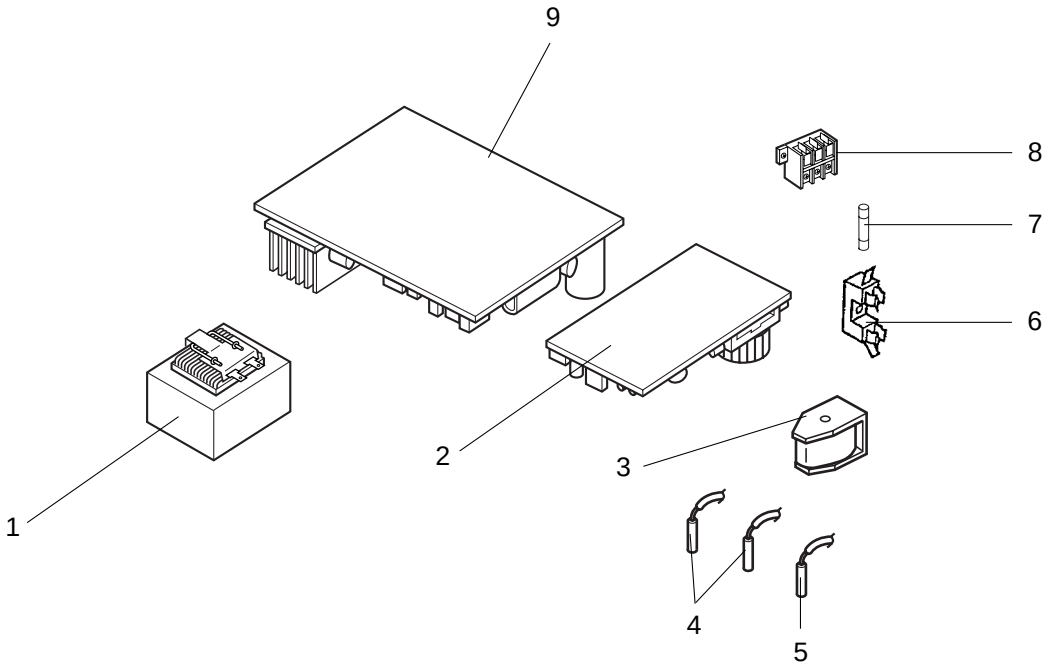


Part number that is circled is not shown in the illustration.

No.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit				Remarks
				MUZ-A09YV-E1	MUZ-A09YVH-E1	MUZ-A12YV-E1	MUZ-A12YVH-E1	
1	E02 838 232	CABINET		1	1	1	1	
2	E02 838 521	GRILLE		1	1	1	1	
3	E02 838 501	PROPELLER		1	1	1	1	
4	E02 838 290	BASE		1		1		
	E02 840 290	BASE			1		1	
5	E02 838 900	COMPRESSOR	MC	1	1			KNB073FBVH
	E02 839 900	COMPRESSOR	MC			1	1	KNB092FAAH
6	E02 065 506	COMPRESSOR RUBBER SET		3	3	3	3	3RUBBERS/SET
7	E02 838 661	STOP VALVE (GAS)		1	1	1	1	ϕ9.52
8	E02 838 662	STOP VALVE (LIQUID)		1	1	1	1	ϕ6.35
9	E02 838 245	SERVICE PANEL		1	1	1	1	
10	E02 838 233	BACK PANEL		1	1	1	1	
11	E02 838 640	EXPANSION VALVE		1	1	1	1	
12	E02 838 493	EXPANSION VALVE COIL	LEV	1	1	1	1	
13	E02 838 961	4-WAY VALVE		1	1	1	1	
14	E02 838 293	SEPARATOR		1		1		
	E02 840 293	SEPARATOR			1		1	
15	E02 838 515	MOTOR SUPPORT		1	1	1	1	
16	E02 838 523	CONDENSER NET		1	1	1	1	
17	E02 838 297	TOP PANEL		1	1	1	1	
18	E02 838 630	OUTDOOR HEAT EXCHANGER		1	1			
	E02 839 630	OUTDOOR HEAT EXCHANGER				1	1	
19	E02 838 301	OUTDOOR FAN MOTOR	MF	1	1	1	1	RA6V21-□□
20	E02 840 526	DEFROST HEATER	H		1		1	
21	E02 840 381	HEATER PROTECTOR	26H		1		1	
(22)	E02 282 937	CAPILLARY TUBE		1	1	1	1	ϕ3.0×ϕ2.0×200

MUZ-A09YV -E1 MUZ-A12YV -E1
MUZ-A09YVH -E1 MUZ-A12YVH -E1

13-2. OUTDOOR UNIT ELECTRICAL PARTS



No.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit				Remarks
				MUZ-A09YV-E1	MUZ-A09YVH-E1	MUZ-A12YV-E1	MUZ-A12YVH-E1	
1	E02 838 337	REACTOR	L61	1	1	1	1	
2	E02 838 444	POWER P.C. BOARD		1		1		
	E02 840 444	POWER P.C. BOARD			1		1	
3	E02 838 490	R.V. COIL	21S4	1	1	1	1	
4	E02 838 306	THERMISTOR SET	RT61,RT62	1	1	1	1	DEFROST, DISCHARGE
5	E02 838 308	AMBIENT TEMPERATURE THERMISTOR	RT65	1	1	1	1	
6	E02 735 241	FUSE HOLDER		1	1	1	1	
7	E02 735 382	FUSE	F61	1	1	1	1	250V/20A
8	E02 838 374	TERMINAL BLOCK	TB	1	1	1	1	3P
9	E02 838 451	INVERTER P.C. BOARD		1	1			Including heat sink and RT64
	E02 839 451	INVERTER P.C. BOARD				1	1	Including heat sink and RT64

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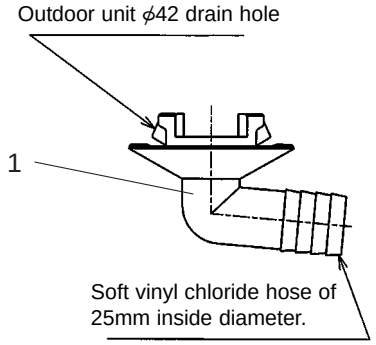
MUZ-A09YV -E1
MUZ-A12YV -E1

13-3. DRAIN SOCKET



No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MUZ-A09YV- E1	MUZ-A12YV- E1	
1	E02 838 704	DRAIN SOCKET		1	1	

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